

SATURDAY, MARCH 2, 1872.

# Contributions.

## PAPERS ON BRIDGE CONSTRUCTION.

NO. V.—REMARKS UPON THE PROPORTIONING OF BRIDGE THE LOADS TO WHICH THEY MAY BE SUBJECTED, AND THE ECONOMY RESULTING THEREFROM.

It is the usual practice of railroad authorities in this country, when inviting tenders for such bridges as they want, to accompany their invitation with the require ments that they are be proportioned to carry so many tons per lineal foot, with such and such a factor of safety utterly regardless of span or circumstances of location or alignment. Now, a bridge is affected by loads according to its span. The longer the span the less is the shock of a passing load felt, and consequently less material is required for equivalent strength and endurance. In the writer's opinion, short-span bridges—say below one hundred feet—are seldom built strong enough, and long-span

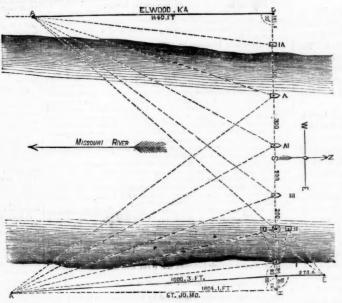
bridges-say about one hundred and fifty feet-are frequently made needlessly strong, involving a great waste of money. Shortspan bridges, particularly below fifty feet, have a dead weight small in proportion to the live load, in addition to which speed is never slackened in crossing them. terminal bridges, or those near or at prominent stations, are exposed to an incessant service, from shifting engines starting and stopping upon them, besides the regular traffic. If, in addition to this, such bridges are located on curves, as they frequently are, it is easy to see that they ought to be made more than ordinarily strong when compared to bridges along an unsettled portion of the line which carry only the usual time-table trains. While most engineers will agree with the general remarks made above, should they give the subject a moment's considera-tion, there is much difference of opinion among experts as to the proper standard of strength for railway bridges, which is the more surprising when the same positive data are open to all, enough so at any rate to secure a uniform practice among them. Some three years since, the American Society of Civil Engineers at their annual convention appointed a committee to collect the

data, and to report at their leisure, necessary recommending a standard strength The committee consisted of five sup bridges ed experts, and after much discussion they concluded to disagree. The matter was never brought up for the society to pronounce upon, the committee feeling that if they could not agree upon a proper standard of strength it was hopeless to expect an agreement from ten times their number. While agreeing in general principles, the committee viewed the importance of data in different lights, and of course supported the results of their observations to each other accordingly.

The usual maximum loads that come upon bridges, at varying speeds, are those produced by an engine and tender followed by a loaded freight train or coal cars. Exceptional loading may occur where two engines are on a span at the same time, and under very rare circumstances three engines may be so located. For example, three standard freight engines of the Pennsylvania Rail road with their tenders would occupy a space of just about 160 feet, and when tenders are loaded with fuel and water the load per lineal foot would be a little over 2,300 lbs. These engines have six drivers with forward truck. A thirty-ton sleeping car occupying a space of 64 feet would equal a distributed load of less than 1,000 lbs. per foot. A loaded box car which occupies a sp of 30 feet would average about 1,400 lbs. per lineal foot, while the heaviest class of loaded coal cars will seldom reach 2,000 lbs. per lineal foot. Of course local and gauge considerations will modify the above distribution of extreme loading for ordinary cases, and will require special provision. Coal cars try the merits of a bridge, and are worse in their effect than any other class of traffic. Such cars are usually short, are on four wheels, and ently with only apologies for springs, and have a kind of trotting jump, so to speak, in their motion.

Thus far nothing has been said of the panel-system loads, and those on the floor beams. Of course this may be largely, and is in most cases, in excess of any loading given

It varies with the length of panel, and may be as high as two tons per foot for an eleven-foot panel. Some eneers give the maximum loading on the floor system at a higher rate than this, allowing no value to the track stringer (usually of wood) in distributing the load over two panels, for the reason that the track stringer may bedecayed or be put in by ignorant men. While giving this view the full consideration that appears to belong to it, it is, in the writer's opinion, involving an un ry expense in the floor system, because any railroad that can afford an iron bridge will have in its service competent men to look after the perishable part of such structures and see that renewals are put in properly. Even supposing the track stringers to become so rotten to let an engine through the panel, through the engine will go, even if the iron girders were twenty times as Letting every one judge for himself whether or not the track stringers should have influence in extend-ing the maximum panel loads in a structure, and keeping in view what has preceded as to the loading caused by various kinds of traffic, it is evident that bridges should be proportioned according to their span, and that the web system may be exposed to extreme strains, while the chord system will rarely if ever be so exposed; and that judicious harmonizing of the various parts of such structures will often result in a surprising economy in long spans, and a greater cost in short ones than railroad companies are accustomed to pay.



Locating Bridge Piers.

For spans of 175 feet and over, we can economize wisely over the usual custom by distinguishing between the effect of the dead load of the structure and that caused upon the various parts of the system by the live load. The former load, being a static one, can be computed for a lower factor of safety; while the latter load should have a higher factor for the web system than for the chord system. It is, in the writer's experience, the almost universal custom to call for 10,000 pounds (per square inch) for the maximum strain in all tension bars, and 8,000 (per square inch) for the maximum strains in all compression members. Bearing in mind that the chord sys n can only be fully strained by a full loading, and the web system by such loading on the half span, very nearly, and that this loading is always taken per foot run mo than really comes upon the structure, even when loaded with engines, it would be a self evident economy to put 12,000 lbs. per square inch for tension, and 9,000 to 10,000 per square inch for compression in the chord sys'em, being a factor of about one-fifth, while the web system which might be strained by the assumed loading, could be proportioned for the usual factor of one-sixth.

For very long spans, the economy resulting from a judicious distribution of the factors of safety will be very marked, and it will amply repay any railroad company in inviting proposals to pay attention to this point The same reasons are sufficient to show that short-span bridges should be constructed under a high factor of safety, and all parts proportioned under an extren loading. A few words regarding the construction of the flooring of bridges are not out of place here. With few exceptions the floor beams of iron are cor panel points, which is as it should be, since all loads in the computations are considered as acting at such points. Occasionally we meet with wooden floor beams resting upon the chord links; but this is so self-evidently unmechanical, if not wrong in principle, that it will correct itself in time. A solid floor can be made by suspending itself in time. A solid floor can be made by suspending boilers sometimes explode, and argues that an old boiler the floor beams in the line of the chords, and then placing is stronger and therefore safer than a new one. This

the wooden beams in the usual way; or else, as recommended by Mr. T. C. Clarke, by having a sufficient number of heavy stringers with large cross-ties laid close together, so that in the event of an engine jumping the track the floor in either case would be stout enough to sustain it. Such a floor, with guard timbers on the sides, seems to cover all contingencies excepting that o fire. Guard rails are valuable, and they would be a wise addition to those structures where the floor is not sufficiently heavy and strong to carry a derailed engine

New York, February 19.

#### LOCATING BRIDGE PIERS.

ALF. P. BOLLER, C. E.

TO THE EDITOR OF THE RAILBOAD GAZETTE:

It having been suggested that I had condensed too much my article upon the above subject, as published in your paper of January 6, and that I had not given any detailed account of the necessary triangulation required in this special case, I avail myself of your columns to mend my account by furnishing the plan and actual admeasurements used on the St. Joseph Bridge.

By reference to the plan, it will be seen that the bridge will have three spans of 300 feet each, and a draw-span of 1.000 feet, making the entire length 1,300 feet, resting upon an abutment at the east end, then a pivot pier, folwed by four piers. A point O was taken at the west-ern end of the center line of the bridge, and

a base line perpendicular thereto was rately measured 1,440 feet long to point D.

And upon the east end of the axis of

the bridge a point B was taken, and a base line at an angle of 93 degrees was measured 1,606.3 feet to point A, and a short base of 278.4 feet long was measured at right angles to point E, in the opposite direction.

At A, B, C and D, center-points, which could not be disturbed, were carefully placed; and from these, by transits, after calculating the proper angles to each point along the line of the axis of the bridge, the positions of the piers were established.

For instance, to locate the center point of pier No. IV., with a transit at A. C and D. divide the distance 784.4 feet (from C to center of pier IV.) by the length of the perpendicular base-line C D, 1,440 feet. The quotient is the natural tangent of the angle C D IV. Turn this angle by the transit at D; at the same time divide the distance from pier IV. (868.1 feet) to the imaginary point H, by the length of the imaginary perpendicular base-line HA (1,604.1 feet), and the quotient will be the natural tangent of the angle HA IV. Turn this angle from point A, by remembering that H A B is 3

degrees, and the remainder is the angle B A IV. In the meantime the transit at C keeps the alignment upon the axis of the bridge, and the intersection of the lines from the two transits at A and D will locate pier IV.

The imaginary point H is found by multiplying the natural line of 3 degrees (.05234) by the length of A B (1,606.3), and the distance H B is 84.1 feet. This method, where the nature of the ground does not permit a perpendicular base-line, is preferable to the formula (for two sides and an included angle) used by Mr. Nicholl in your paper of the 6th of January.

From the point E, the positions of the draw-rests are stablished, by the same method of triangulation, and are ecked from point B.

Pier VI. and the eastern abutment, being out of the water, could be located by actual measurement along the line of the bridge from points B and C.

As I mentioned before, points B and C are up some 30 feet above the ground, and above all material and false work, so the line of the bridge can at all times be determined without obstruction or delay.

The accompanying sketch may serve to make plain what I have undertaken to set forth

W. M. JOHNSON, C. E.

# Patched Boilers.

TO THE EDITOR OF THE RAILBOAD GAZETTE :

Your correspondent, "Coarse spun Facts," offers sor sharp criticism on an article which recently appeared in the GAZETTE on boiler explosions. The article referred to by "C. S. F." was written soon after the occurrence of several serious explosions of old boilers which had recently undergone thorough repairs, and reflected somewhat on the dangerous and too-prevalent practice of patching old boilers

"C. S. F." has found by recent experience that new

style of reasoning is similar to that of a justice of the peace out West who had a prisoner brought before him charged with stealing a hog. "Gentlemen," said the charged with stealing a hog. "Gentlemen," said the justice, "the prisoner is not guilty. One witness swears he saw him steal the hog, and four swear they did not see him steal him. The prisoner is discharged.

"C. S. F." has arrived at the conclusion that as none of the boilers that recently exploded under his notice were old and patched, new boilers are unsafe. This will perhaps create a demand for old boilers, and who shall say that some lucky inventor will not realize a fortune on a patent process for "aging" boilers? Certainly no one after this will purchase a new boiler, and the scrap heap will be known no more forever. Where is the Chi-cago man who patented a process for "aging whisky?" Let him try his hand on boilers.

The difference of opinion in regard to the cause of boiler explosions is somewhat remarkable, and one cause of this diversity of opinion is the habit (for it is a habit) men have of jumping at conclusions.

Your correspondent does not state the age or condition of the boiler that exploded in Baltimore, and he takes it for granted that the two locomotives last mentioned by him were new, or that "they certainly could not be very old," for the roads on which they took place are not some of our leading lines of thirty years' standing that have never had an explosion, and it might reasonably be supposed the machinery would be new and in good condition."

These conclusions would be natural enough, but the writer of this has assisted in gathering up the wrecks of two locomotives that exploded on new roads. They were both second-hand engines, and had been patched. The engineer of one of them had repeatedly refused to run her, knowing the boiler to be unsafe. The company was short of engines, and the master mechanic persuaded him to run her a few more trips, and he would give him a new engine.

The engineer stated positively, on the day of the explosion, that he would never risk his life on her after that trip. Singularly enough she exploded on that trip. killing the engineer and three others. The company paid his widow \$7,000. The age of this boiler was said to be 17 years. The other one was upward of 20 years old. Both roads were new, and we might argue from this that new roads are dangerous places for old boilers, notwith-standing the good quality of the two specimens of old iron mentioned by "C. S. F."

But, seriously, there is nothing in which the doctors so much disagree as the cause of boiler explosions. A man in Maine knocks an old boiler to pieces with a hand hammer, and concludes that iron becomes crystallized. brittle and rotten by long-continued use in a steam boiler. A man in Ohio takes iron of a superior quality out of an old boiler and considers that the best evidence in the world that iron improves with age. Therefore if an old hoiler explodes it must be from mysterious causes, and not from weakness and excessive pressure.

Every man who has given the subject attention has his pet theory regarding the cause or causes of boiler explosions; but when a boiler explodes under circumstances unfavorable to his reputation as an engineer, he is willing to accept any theory that will relieve him from blame. But on this as on all other subjects,

"A man convinced against his will, Is of the same opinion still."

WM. S. HUNTINGTON.

# PENNSYLVANIA RAILROAD COMPANY.

Twenty-fifth Annual Report.

Office of the Pennsylvania Railroad Company, Philadelphia, February 19, 1872.

To the Stockholders of the Pennsylvania Railroad Company:
Your Directors feel much gratified in submitting to you the following very satisfactory statements of the business of your railways during 1871.

The earnings of your main line, 358 miles in length and 258

innes of bisheres, were.		
From passengers\$3,719,264	36	
From emigrant passengers 156,393		
From mails 147.893	12	
From express matter 362,349	90	
From general freights	51	
From miscellaneous sources 281,632	84	
	±18,719,836	8
PYDPVopa	4.01.000	~

ETLEVERS'					
For conducting transportation	3,049,027 1,202,521 3,302,286 229,845	28 74 95 77		9.4	•
			11,040,400	04	•

Leaving net earnings in 1871 \$6,896,403	51
The total amount of revenues compared with last year is:	
1871 \$18,719,836 1870 17,531,706	85 82
Increase \$1,188,130 The changes in the sources of revenue are shown below:	08
Increase in first-class passengers	16 04 67

The only items of income that show a decrease are emigrants (\$6,279.80) and miscellaneous (\$241,341.16). The first is accounted for from circumstances connected with the war between France and Germany, and the latter from the large collections made in 1870 from other railways for rents, &c., due to previous years. The whole number of passengers carried in 1870 was 4,352,779 and in 1871, 4,699,985, an increase of 347,216, or nearly 8 per cent.

and in 1871, 4,699,985, an increase of 347,216, or nearly 8 per cent.

The average distance traveled by each passenger was 32 53-100 miles, being 2 12-100 of a mile less than in 1870.

The number of tons of freight moved (including 524,451 tons of fuel and other materials transported for the company) was 7,100,294, embracing 3,161,441 tons of coal. It was last year 5,804,051 tons, showing an increase of over 223 per cent.

The average charge per net ton per mile upon freights during the year was 1 3887-1000 cents, against 1 549-1000 cents last year, 1 718-1000 cents the year previous, and 1 906-1000 cents in 1868, and per passenger 2 53-100 cents per mile, against 2 49-100 cents last year, or an average decrease in rate of freight charges in 1871 below those of 1870 of 10 35-100 per cent, and in passenger charges an increase of 1 61-100 per cent, per mile.

The actual cost of operating your railroad, including branch lines, in 1871, was 60 37-100 per cent, for treceipts.

The earnings of the Philadelphia & Eric Railroad in 1871 were:

f	The earnings of the Philadelphia & Erie Railros	d in 1871
)	From passengers	31 10 16
1	m + 1 ( 1- A10 000 11- of A)	42 54

Total (nearly \$12,300 per mile of road)	\$0,548,800	
The operating expenses during the same period were:		
For conducting transportation \$751,360 36		
For motive power		
For maintenance of cars. 295,148 07		
For maintenance of way 995,192 16		
FOR maintenance of way 350,138 10	2,782,972	6
	A, 104,014	

Showing a balance to credit of Philadelphia & Eric Railroad.

road.

The revenue of the lines operated by this company in 1871, and the amounts paid for their working expenses, interest and dividends, are as follows:

From From	the	Pennsylvania Philadelphia	Railros & Erie	d and Railro	branches	 18,719,836 8,542,263	85 73
	Total	1				22 262 100	

And the expenses of operating them were :		
Pennsylvania Raiiroad\$11,823,433	34	
Philadelphia & Erie Railroad (including		
\$759,290.93 net earnings paid to that		
(company) 3 549 963	79	

The net profits of the year 1871 upon all the operations of the company being. \$6,896,403 51 From which deduct dividends declared in May and November (each five per cent.), with the taxes paid thereon... \$3,623,062 50 Interest paid by the company after deducting interest and cividends received.

188,039 94

deducting interest and dividends are ceived.
Paid for the lease of the Harrisburg & Lancaster Railroad.
Annual payment to the State of Pennsylvania on account of interest and principal due upon the purchase of the works between Pittsburgh and Philadelphia.

Leaving a balance to credit of profit and loss on account of the Pennsylvania Railroad of 1,470,290 78

But from which is to be deducted the excess of advances made by this company over the amount received from the United Railroad and Canal Companies of New Jersey and the Philadelphia & Trenton Railroad Co. toward the payment of interest, dividends and operating expenses, etc., prior to Jan. 1, 1872

Less profits of lease of Pittaburgers and the payment of interest, dividends and operating expenses, etc., prior to Jan. 1, 1872

Less profits of lease of Pittaburgers and the payment of interest, dividends and operating expenses, etc., prior to Jan. 1, 1872

operating expenses, etc., prior to Jan. 1873
Less profits of lease of Pitteburgh, Fort Wayne & Chicaco Railway, and Pittsburgh & Eric Railroad, until transferred to the Pennsylvania Company on April 1, 1871 184,824 02

This balance is obtained from the business of your railway for the past year, after charging the amount (\$21,011.40) expended in straightening the old Philadelphia & Columbia Railroad, purchased of the State, and (\$440,512.45) the cost of substituting iron for wooden bridges, steer rails for iron rails, etc., upon the whole railroad, to maintenance of way, and placing the deficiency on the lease of the New Jersey railroads in 1871 to expense account.

count.

The acceptance of the onerous terms of the lease of the property of the United Railroad Companies of New Jersey is only to res in the sources of revenue are shown below:
rest-class passengers.
\$123,893 16
1,359,174 04
1,496 77
xpress matter.
\$1,485,750 99

\$1,485,750 99

\$1,485,750 99

\$1,186,130 03

The acceptance of the onerous terms of the lease of the pretry of the United Railroad Companies of New Jersey is only
be justified by the very great importance of securing to this co
modations could be erected for the receipt and storage of traffic of the extended system of railways that you control commercial centers of the West—accommodations essential

the development of this traffic, and which it could not otherwise secure without violating existing arrangements with those com-

The amount to be paid under the lease is \$1,948,500 per anim for division among the shareholders of the companies, this impany receiving all of their assets and assuming all of their digastions.

company receiving all of their assets and assuming all of their obligations.

For several years past the dividends of the United Companies have been at the rate of ten per cent. per annum, while their net revenues have not justified a rate exceeding seven per cent., the deficiency having been made up from a surplus fund that had accrued during the war, which has become exhausted.

The terms of this lease required the delivery of these works on the first of July last, but in consequence of an injunction obtained by dissatisfied shareholders from the Chancellor of New Jersey, this was not effected until the first of December—too late to introduce before the close of the year any reforms in their administration with a view to lessen the cost of operating them. This circumstance has materially increased the amount that we had to advance under the lease, on account of the business of 1871. It is believed, however, that, by vigorous reforms in their future administration, and the constantly increasing tomage that we shall throw upon these works, they will in a few years meet the high rental agreed to be paid for them. Their revenues cannot be increased by an increase of the rates of transportation, as these have generally been kept too high to produce the best net results.

In its last annual report the board referred to the disposition

as these have generally been kept too high to produce the best net results.

In its last annual report the board referred to the disposition it proposed to make of the large interest that this company has acquired in railways beyond Pittsburgh for the purpose of connecting your main line with the trade centers of the West, the object being to secure, by a single management of these works, harmonious action throughout the entire system of railways that we control, and at the same time to obtain the best results from the large amount of rolling stock upon them, by transferring, as occasions may require, portions of that of one line to another, where the demand for its use was more urgent and important to the interest of the company and the public. With this object in view, a charter was obtained for the "Pennsylvania Company," and all the interest held by this company in these lines (except in the Cleveland, Mount Vernon & Delaware Railroad), essential to their control, transferred to it for a sum which fully covers their cost to us with interest, and preferred six per cent, shares amounting to \$8,000,000 received in payment therefor. This stock to participate in all the profits of the company above 6 per cent.

The cavital of the Pennsylvania Company is fixed at \$12,000.

cent.

The capital of the Pennsylvania Company is fixed at \$12,000,-000, four millions of which is to be common stock that may be disposed of to individuals at not less than par. Of this stock only \$200,000 has been subscribed for, all of which has been taken by its managers to perfect the organization of the com-

disposed of to individuals at not less than par. Of this stock only \$200,000 has been subscribed for, all of which has been taken by its managers to perfect the organization of the company.

The operations of the "Pennsylvania Company," since it entered into possession of these works on the 1st of April last, have been very satisfactory: demonstrating fully its ability, after 1871, to make regular dividends to its shareholders of not less than six per cent. per annum; while the original object that this company had in making these investments has been secured.

In organizing the Pennsylvania Company it was understood that the whole of the net revenues accruing to it during 1871, from the lines committed to its charge, were to be expended in their maintenance and improvement, and in additions to its rolling stock, which has been done, and the property in consequence is very greatly improved.

Since your last annual meeting this company has acquired a lease of the Pittsburgh & Cleveland Railroad for nine hundred and ninety-nine years, upon favorable terms, and have transferred it to the Pennsylvania Company.

A lease has also been made of the railroads of the Jefferson-ville, Madison & Indianapolis Railroad Company, carrying with it a control of the bridge over the Ohio at Louisville—through the Pittsburgh, Cincinnati & St. Louis Railway, to Washington, Pa., a distance of twenty-two miles, has also been leased to the Pittsburgh, Cincinnati & St. Louis Railway, to Washington, Pa., a distance of twenty-two miles, has also been leased to the Pittsburgh, Cincinnati & St. Louis Railway, to Washington, Pa., a distance of twenty-two miles, has also been leased to the Pittsburgh, Cincinnati & St. Louis Railway, to Washington, Pa., a distance of twenty-two miles, has also been leased to the Pittsburgh, Cincinnati & St. Louis Railway, to Washington, Pa., a distance of this line since it was opened for busmess have shown that its profits are already ample to meet the interest upon its mortgage bonds of half a million of dol

at par.

A contract has also been made by the Pennsylvania Company with the Plymouth, Kankakee & Pacific Railroad to operate its line as soon as it is in readiness for business.

In addition to these leases and contracts, the Pennsylvania Company has entered into a satisfactory arrangement for the control of the Vincennes & Cairo Railroad after completion, thus extending their lines to the latter point, from whence the Cairo & Fulton Railroad will connect with the International Railway now being built southwestwardly into Texas.

These and minor arrangements for increasing the business of the Pennsylvania Company must add largely to its revenues, while at the same time they will materially augment those of the parent company.

the Pennsylvania Company must add largely to its revenues, while at the same time they will materially augment those of the parent company.

All such contracts and arrangements made by the Pennsylvania Company are to be submitted to and approved by the directors of the Pennsylvania Railroad Company, but none of them are to extend beyond the Mississippi on the west, or Chicago on the northwest.

The Pennsylvania Company was organized by the election of Thomas A. Scott, Esq., as President; Wm. Thaw, Esq., Vice President; George B. Roberts and Hugh J. Jewett, General Solicitors, who, together with J. N. McCullough, H. H. Houston and Hon. T. L. Jewett, constitute the Board of Managers. All of these gentlemen have had a long experience in the management of transportation and of railways, and are eminently qualified to secure the success of such an enterprise.

The general management of this extended property, now amounting in the aggregate to 3,200 miles of railway, has been intrusted to J. N. McCullough, Esq., who had gained an envisble reputation by his energetic and judicious administration of the business of the Pittsburgh, Fort Wayne & Chicago, and Pittsburgh & Cleveland railways. All the railways committed to his management have during the year been able to meet from their own revenues their obligations to their creditors and lessors, except the Little Miami and the Indianapolis & Vincennes, while in the aggregate they have yielded reasonable profits to the lessee

The lines that have fallen short of their obligations, it is believed, from the development of the local resources of the country traversed by the last-named, and the completion of the bridge across the Ohio River at Cincinnati, at the southwestern end of the first, now nearly ready for use, will also in a few years become profitable to the lessees.

The adjustment of the rates of freight and the management of the Pennsylvania Company have been committed to Mr. Thaw, Vice-President, whose long experience in transportation eminently qualifies him for the performance of the duties that have been assigned to him.

The board, in its last report, stated the circumstances that induced it to aid in the construction of the Baltimore & Potomac Railroad, a line extending from the Northern Central Railroad, under Baltimore and through Washington to the south bank of the Potomac, whence it is continued by the Alexandria & Fredericksburg Railroad Company to the Fredericksburg & Richmond line, which connects it at Richmond with the whole system of Southern railways south of that point. These railways are now largely controlled by the Southern Security Company, in which this company became a shareholder to protect its investment in the Baltimore & Potomac Railroad. The Southern Security Company is composed of gentlemen friendly to our interests and objects, and of which Gen. G. W. Cass is President.

The Baltimore & Potomac Railroad is nearly ready for use between the south bank of the Potomac and Baltimore, and the tunnel under the latter city will be finished during the ensuing winter. When this is effected there will be an unbroken railroad, from our terminus opposite New York, from Philadelphia, and from Baltimore, to all points of importance in the South Atlantic and Gulf States, operated continuously by locomotive power, and with the single object in view, to promotate in the south and Gulf States, operated continuously by locomotive power, and with the single object in view, to promotive power and with the single objec

sixteen miles, through a fertile country, to the rich hematite iron ore deposits of Morrison's Cove, the transportation of which product, it is also proposed to aid in the construction of a branch line to the valuable ore deposits of Blair and Center counties, commencing the continuous of the construction of a branch line to the valuable ore deposits of Blair and Center counties, commencing the continuous of the construction of the continuous cont

to thirty per cent. of their present holdings, to be paid as called for in installments of twenty-five per cent. each.

The company now own stocks and bonds, including those in the sinking fund—nearly all acquired in perfecting its present system of railways and canals—amounting at per to \$55,000,000, which, at a low estimate of their value, are worth \$43,000,000. Many of these securities yield no present income, but in the aggregate they can be gradually disposed of for at least the sum estimated as their value.

If the state of the market during the year will justify the sale of any of these securities, the installments upon the stock it is proposed to distribute among you may not be so rapidly called in.

The surplus net revenues of your works during the past year, without considering any increase of their profits from the increase of traffic it is proposed to provide facilities for, were ample, in 1871, to meet the usual dividends (five per cent. semi-annually) upon the addition to the capital stock of the company it is proposed to issue. And in these profits we have not included any income from our stock (\$8,000,000) in the Pennsylvania Company, which, can hereafter pay regular dividends to its share-holders, or from the \$3,500,000 of stock held in the Pennsylvania Canal Company, which, after this year, will be in a condition to divide its net earnings, nor any income from our large interest in coal properties that this company has found it necessary to purchase to prevent the diversion of this traffic from the canals that we control—built by the State expressly for the development of these interests—to those of rival improvements.

The commercial interests of Philadelphia, which have for so many years been apparently stationary, have shown, during the past season, gratifying evidences of revival. It has been the settled policy of this company to encourage the development of this interest by anticipating its demands for increased accommodation and facilities for the distribution of products to the consumer

rade of this city and surrounding country, an extensive granary was erected on the Schuylkill, where each car load of grain may be kept in separate bins. This building has been entirely successful, and its capacity may be doubled without a heavy expenditure.

Diversity from the West, will require still larger facilities than only can, through its numerous connecting rankway, bring to the still before facilities than only on the still before facilities than only on the still before facilities than only on the still before facilities than with us. We see no place so well located and adapted to the objects desired—that can be had at so small an outlay—as will be provided by the opening of Delaware avenue by the city, southwardly to Christian street, of a width of not less than 90 feet. A double-track railway may be laid upon this avenue from which turnouts can be run into the existing warehouses upon it, and on to the adjacent wharves, all situated at the most convenient point in the city for shipment. By this plan a large amount of capital may be saved in the erection of warehouses, which can be better employed by this company in the increase of its equipment. Such an arrangement can only be carried into effect through the co-operation of the corporate authorities, who will doubtless appreciate its importance to the revival and increase of the commerce of the city.

Under the authority given by you at your last annual meeting the American Steamship Company of Philadelphia has been rully organized by the election of H. J. Lombacrt, Esq., as President, and Edmund Smith, Esq., as Secretary and Treasurer, with a capital of \$704,700, of which this company owns \$400,000. The first mortgage six per cent. currency bonds of the company, amounting to \$1,500,000, have also been issued under the guarantee of this company, and all of them taken at particular and the company, and all of them taken at particular and the particular and

heavier than that formerly used upon the low loss lines.

The adoption of the proper gauge to be used in each case must be determined by the circumstances that surround the proposed improvement, as neither can be judiciously adopted until all these are known and considered. The narrow gauge is certainly not applicable to a line between Philadelphis and Pittsburgh. Experience has shown that the gauge of your railway, which had its origin in the law of England, regulating the gauge that had been found best for common road carriages, is of ample width to give the best results on all first-class lines where speed of transit is necessary and the amount of transportation large.

The general office of the company in this city having become inadequate for its business, it has been sold to the Lehigh Val-

ley Railroad Company. The new building will be ready for use by the 1st of April next, and will, it is believed, be sufficient for the accommodation of the business of the company for many

for the accommodation of the business of the company for many years.

Your Directors desire to express their acknowledgments to the officers and employees generally for their strict attention to and successful management of the business of the company. The acquisition of the lines in New Jersey has added to their duties and responsibilities. These lines have been brought under the general management of A. J. Cassatt, Esq., who has, during the past year, so successfully conducted the business of the Pennsylvania Railroad as General Superintendent.

The General Superintendent of the Philadelphia & Erie Railroad, W. A. Baldwin, Esq., also deserves the thanks of the stockholders for his close administration of the affairs of that railroad, which, notwithstanding the low charges made for its use, has shown a profit upon its operations.

By order of the Board.

J. Eddan Thomson, President.

J. Engan Tuowsov, President.

# Report of the Pittsburgh and Connellsville Rail-road.

The seventeenth annual meeting of the stockholders of the Pittsburgh & Connellsville Railroad Company was held at the company's office, December 4.

The President's annual report was presented and read as follows:
To the Stockholders of the Pittsburgh & Connellsville Railroad

Company:
The President and Directors respectfully submit the following statement of the affairs and proceedings of the company

for the year ending October	31, 1871:			
GROS	S EARNINGS			
	1869.	1870.	1871.	-
From passengers	\$166,675 75	\$178,357 49	263,704	
From freights	430.016 88	467,288 53	638,536	44
From mails	3,650 00	3,600 00	5,218	32
From miscellaneous sources	8,576 06	6,490 09	12,535	33
Total	*600 018 60	\$65K 786 11	0964 989	13

The earnings are thus \$309,253.02 greater than last year, and

\$356,070.44 greater than 1869.	
EXPENSES OF OPERATION.	1871.
Conducting transportation Repairs motive power Maintenance cars Maintenance road. General expenses	162,807 70 50,262 78 815,165 61
Total. Excess of receipts over	\$217,356 41
The balance of earnings for the past fiscal year eq 22½ per cent.	uals about

The balance of earnings for the past fiscal year equals about 22½ per cent.

The gross earnings are about 47 per cent. more than the year 1870, and 53½ per cent. more than 1869. The earnings of the road between Uniontown and Pittsburgh have been \$820,-108,79; or 25 7-100 per cent, greater than last year.

The total number of passengers carried all distances were 700,423. For the same the amount earned is \$263,704.04, an increase of 169,412 in number of passengers and \$85,304.55 in receipts for the same.

The total amount of freight in 1871 in tons was 717,299, and the receipts therefrom \$663,536.44; being an increase of 137,229 tons, or about 34 per cent., and of \$206,137.82, also about 34 per cent. in money.

The earnings are apportioned to the different parts of the road as follows: To that between Pittsburgh and Port Perry, 10 6-10 miles, \$185,655.26; between Port Perry and Connells-ville, 46 8-10 miles, \$594,555.07; Fayette County Branch, 14 miles, \$39,398.46; between Connellsville and Cumberland, 92 miles, \$139,545.96; Mount Pleasant Branch, 10 miles, \$53,34.38 — total, \$964,989.13. The increase upon the road as it stood at the end of the last fiscal year is \$164,372.68, or nearly 25 7-100 per cent. The earnings per mile run by freight and passenger trains have been one and 12-100 as against one and 25-100 last year. The number of miles run by passenger and freight trains has been 858,669, and by the construction trains 74,179, in all 932,884; last year 642,783.

The cost of transportation has been \$195,822.71, or 21 cents per mile run by trains, against 18 61-100 last year. The maintenance of motive power, including wages of enginemen and firemen, repairs for engine, fuel, oil, etc., has been \$162,807.70, or 17½ cents per mile run, as against 24 cents last year.

The maintenance of care has cost \$50,262.78, as against \$31,165.61, or cost per mile run \$60,000 and per mile run by trains and per mile run by trains.

The maintenance of motive power, including wages of enginemen and firemen, repairs for engine, fuel, oil, etc., has been \$162,807.70, or 17\frac{1}{2}\$ cents per mile run, as against \$2\$ cents last year.

The maintenance of cars has cost \$50,262.78, as against \$31,-273.15 last year, being 5 38-100 cents per mile run by trains. Last year it was 5 76-100 cents. The general expenses of administration, including salaries, legal and miscellaneous expenses, &c., have been \$23,573.92, or \$2\$ cents per mile run by train. This was \$19,969.48 last year, or \$2\$ cents per mile run. The cost of maintenance and working the road has been \$747,-682.72, exceeding the previous year \$277,745.12, or about \$9\$ per cent. The cost per mile run has been 70 cents; last year it was \$6\$ cents. The ratio of expenses to receipts is 77 47-100; the previous year it was \$716-100 per cent.

The work performed by motive power during 1871 was as follows: Number of miles run, 932,848; number of passengers carried, 700,423; average distance, 11 9-10. Freight—number of tons carried, 717,299; average distance, 37 71-100 miles; tons over whole road, 159,397; tons passing castward, 111,140; tons westward, 606,159. The total value of transportation has been \$1,127,845.67, apportioned as follows: To Baltimore & Ohio road, \$158,473.17; Cumberland & Pennsylvania Company, \$2,-072.63; Mount Pleasant Branch, \$2,310.74; Pittsburgh & Connellisville Railroad, \$964,989.13.

We have received the remaining nine of the ten engines furnished us by the Baltimore & Ohio road. All are charged into the account of the current year. We have also received five provided for us by the Baltimore & Ohio road and built by the Grant Locomotive Works at Paterson, New Jersey. Two of them came within the last few days of the fiscal year. We have purchased nine passenger coaches and built four, one to replace an old number.

The Mount Pleasant & Broad Ford Branch has been completed, and is being operated by us. A lease has been prepared and will be executed his long-announced intent



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#### Editorial Announcements.

The RAILROAD GAZETTE will be printed for the present in New York; our printing house in Chicago having been destroyed. All communications, therefore, whether editoral or business, should be directed to the New York office. The proprietor will receive sub-scriptions and advertisements at his office in Chicago, Nos. 63 and 65 uth Canal street, but letters should be addressed to New York,

Correspondence.—We cordially invite the co-operation of the rail-road public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appoint-ments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the ncerning the progress of new lines, and are always glad to

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

nventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage. tising patronage.

# THE PENNSYLVANIA REPORT.

The operations of a few of the leading railroad companies of this country have become so great and so ex-tended that the record of their operations is a matter of general public interest, quite as much as the reports of some of the government bureaus. Of all these, doubtless, the Pennsylvania Railroad Company is the most important, both by reason of the vast mileage which it controls, directly and indirectly, and by reason of vast territory which the lines in which it is interested cover. The annual report of the directors of this company, which we publish in full in this number of our journal, will, therefore, we believe, be found of much more than ordinary interest, the more so because in it some explanations are made of the company's connections with other corporations which have not been heretofore accurately defined, and because indications of policy are given which are of importance to many and of interest to all.

The very first matter to strike the reader is the enormous amount of the receipts and the enormous bulk of the traffic. The company's lines whose traffic is reported (some new branches have been lately opened, and we take it that the 258 miles of branch lines represent the average of the year) measure in the aggregate but 616 miles; and from these the receipts were \$18,700,000-an average of \$30,389 per mile of road. No other American railroad can equal this, the New York Central with its enormous through and local traffic and about the same proportion of branch lines reporting for the last year \$26,033 per per mile, and the Erie \$18,793 per mile. The net earnings alone are more than \$12,000 per mile, which is much more than is received by most Western roads which pay 10 per cent. dividends, and are counted magnificent

Another notable feature is the growth of the company's traffic, and, in connection with it, the reduction of charges for transportation. Thus we find that, com-

pared with 1870, the passenger traffic increased 8 per cent., while the passenger receipts were only 21 per cent. greater; and more notably, there was an increase of 221 per cent. in the freight tonnage, while the freight receipts were increased by only 9 per cent.

With this enormous traffic at comparatively low rates, the expenses were 60.37 per cent. of the receipts, which is perhaps the average on American railroads, but of course is not easy to keep low where the bulk of the traffic is great and the rates low.

The relations of the "Pennsylvania Company

to this railroad company are discussed. The "Pennsylvania Company" has authority to issue \$12,-000,000 in shares, \$8,000,000 of which is the property of the Pennsylvania Railroad Company and appears to represent the price at which that company transferred its leases (absolutely no material property) to the "Pennsylvania Company." Of the other \$4,000,000 only \$200,000 has been issued, and that was taken by the persons who are its directors, the law requiring that directors should be stockholders. The "Pensylvania Company" can only earn a dividend by making a profit on the roads which it operates over and above the ren-No dividend is made in 1871, it having been agreed that the profits of that year should be applied to the increase of the rolling stock and the improvement of the roads which it operates. But hereafter Mr. Thomson affirms that it will be able to pay six per cent. dividends on its stock, which will be an addition of \$480,000 to the income of the Pennsylvania Railroad Company, which alone is sufficient for a dividend of nearly 11 per cent, on its capital stock. As constant additions are made to the lines operated by the Pennsylvania Company, if the new leases are made on as favorable terms as the old ones, there seems no reason why these profits should not increase. During the year and since the organization of the Pennsylvania Company, leases were made which gave into its charge the Cleveland & Pittsburgh Railroad, the Jeftersonville, Madison & Indianapolis Railroad and the Chartiers Railroad; a line 16 miles long was constructed to connect the Cincinnati & Muskingum Valley road with the rest of its system; a contract was make by which the Mansfield, Coldwater & Lake Michigan Railway will be completed and turned over for it to operate, affording branches to Toledo and through Northwestern Ohio and Southern Michigan; a contract has been completed for operating the Plymouth, Kankakee & Pacific Railroad as soon as it shall be completed; and arrangements completed for a similar use of the Cairo & Vincennes road.

Leases are made by the Pennsylvania Company only after the agreements have been submitted to and approved by the Pennsylvania Railroad Company, and the report adds, " none must extend beyond the Mississippi

on the west and Chicago on the northwest,"

The report says that the Pennsylvania Railroad Company is a stockholder in the "Southern Security Company," but does not mention the amount or the proportion of its holdings in that company. It does say, however, that the company "is composed of gentlemen favorable to our interests and objects." It does not enumerate the lines controled by this company, but says that when the Baltimore & Potomac Railroad is completed (as it soon will be) there will be continuous lines from New York, Philadelphia and Baltimore "to all points of importance in the Southern Atlantic and Gulf States, operated continuously by locomotive power, and with the single object in view to promote the internal commerce between the North and South by the adoption of rates of freight that, while they yield a reasonable profit upon their transportation, will at the same time be placed at figures which cannot fail to secure the movement by it of a vast amount of tonnage that is now forced into other channels or lies dormant upon Southern soil." This statement Southern people will be likely to This statement Southern people will be likely to remember and regard as a pledge that a lease by the Southern Security Company means cheaper freight rates.

The report mentions several branches completed, commenced, or to be commenced, which will add to the local traffic of the road, chiefly in transporting coal, iron ore or coke, and one of which, not constructed by this company, will afford it a low-grade line across the Alleghe nies, on which freight moving eastward (as the largest bulk of the through freight does) will meet no upward grade of more than sixteen feet to the mile, which, we need not say, will effect a great economy in moving it. Another improvement of importance is that at Pittsburgh, which will greatly facilitate the movement of through trains through or around that place, and which will cost nearly a million.

may subscribe for new stock, to be paid for at par, to the amount of 30 per cent. of their holdings, the proceeds (which will amount of \$10,000,000) to be invested in improvements of the

road and additions to its rolling stock. Payment is to be made at intervals as called for, and these calls may not be made frequently, as the company owns \$55,000,-000 in stocks and bonds of its own and of other co panies, whose market value is now \$43,000,000, some of which may be sold to raise the money needed. One of the improvements not mentioned, but which Mr. Thomson is known to favor and may be looked for at no distant day, is a third track, with which the freight and passenger traffic may be kept from interfering with each other, as they must constantly on a double track with a heavy traffic. The President says that the surplus net revenue in 1871 was sufficient to pay 10 per cent. dividends on the proposed increased issue of stock.

The report also gives an account of the organization of the American Steamship Company, in which the Pennsylvania has a controlling interest, which will soon have four steamers running between Philadelphia and Liverpool, and it also mentions a contract with the International Navigation Company, whose steamers sail between Philadelphia and Antwerp.

# TRIAL OF A FAIRLIE LOCOMOTIVE.

All the English engineering and railroad papers which have reached us during the past week contain reports of a trial of a locomotive built by the Yorkshire Engine Company from the plans and on the system recommended by Mr. Fairlie. This engine has double boilers, with two six-wheeled trucks or bogies, and a pair of 15x22 inch cylinders to each truck. The driving wheels are 3 feet 6 inches in diameter, and the wheel base is 29 feet 51 inches. The total heating surface is 1,688 square feet. The tanks carry 2,200 gallons of water, 3,360 pounds of coal and 180 cubic feet of wood. The weight of the engine in running order is 62 tons, or 138,880 lbs.

The trial was made on a branch road described in The Engineer as follows: "The whole length of the branch is 3.344 vards (1.9 miles). It is laid to two principal gradients; the first, beginning at Lane's lane, rising 1 in 50 (105 feet per mile) for 1,880 yards (1.07 miles), which is followed by other gradients, one 396 yards (22 miles) long, rising at the rate of 1 in 32 (165 feet per mile). curves are very numerous, and many of them as sharp as  $7\frac{1}{2}$  chains (495 feet) radius.

The first experiment consisted in pushing a train of wagons whose total weight, including that of the locomotive, was 303 tons 10 cwt. This train "the engine started" (we quote from *The Engineer*) "with great ease at 11:8:30 a. m., steam blowing off at 141 lbs., and proceeded until the train had got well in on the incline of 1 in 32, when she stopped for want of steam, the pressure having fallen to 90 lbs.; running time, 9 min. That a locomotive should stick fast on a trial trip for want of steam in 9 minutes and 30 seconds after it started does not seem like a very brilliant performance. Let us hear the reasons given by the paper from which we have already quoted for this failure:

already quoted for this failure:

"In the first place, the fireman was quite inexperienced, and he was, no doubt, put out by having two distinct furnaces to attend to. In the second place, several visitors were very injudiciously allowed to stand on the foot-plate, and seriously embarrassed his movements; but the principal cause is to be found, after all, in the very imperfect action of the feeding apparatus. The engine is fitted with two No. 10 injectors, and these throughout the early part of the day, from some reason, worked badly. We need hardly say that the consumption of water was enormous, because the power developed by the engine was enormous; but the injectors would not by the engine was enormous, because the power developed by the engine was enormous; but the injectors would not work save by fits and starts; at one moment the water got quite low in the gauge; at another both injectors caught hold and threw in a torrent of cold water, which effectually pulled down the steam."

So much for the first experiment. The second one is thus described in The Engineer:

thus described in The Engineer:

"At 1:30 p. m. the engine returned to Lane's-lane with four loaded trucks, which were added to the train used in the first experiment, already augmented by a loaded truck dropped at the station by a Sheffield goods train which had passed through about 1 o'clock. The gross load then amounted to 371 tons 10 cwt. With this the engine started at 1:43 p.m., but stopped for steam at 1:50 p. m., on the incline of one in fifty, on a sharp S curve. At 2 p. m. a second start was made with great ease, and the engine then descended the remainder of the line, gaining speed and steam. Part of the run—over the incline of one in thirty-two—was made at fully ten miles an hour. This second experiment effectually settled all caviling about the power of the engine to keep steam."

The latter inference we think few careful readers of the account of the trial will be prepared to admit. If a loco-

account of the trial will be prepared to admit. If a locomotive makes a trial trip and runs out of steam in 9 minutes and 30 seconds, then makes a second trial and "stops for steam" in seven minutes after the start, we can't see how the second trial could "effectually settle all caviling about the power of the engine to keep steam." If a No motive, in two trials over a short road less than two miles long, should run out of steam each time, it would seem to indicate in the strongest way possible that it had not 0.-

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sufficient steaming capacity. If now we find that the best freight locomotives in use have over 50 square feet of heating surface for each ton of adhesive weight on the driving wheels, and that the Mexican engines have less than half that amount, then, in connection with the above experiments, there is very good ground for concluding that Mr. Fairlie's engines are deficient in steam-generating capacity. The fact is, this is an inherent defect in his plan of double-boiler engines. If the whole weight of the water, fuel, boiler and machinery is placed on the driving wheels there cannot be so much heating surface in proportion to the adhesive weight as when some portion of the engine, fuel or water is carried on wheels which are not driven. An eight-wheeled locomotive of the ordinary American type, which weighs 60,000 lbs. without th tender, has a load of about 18 tons (of 2,240 lbs.) on the driving wheels. Such engines ordinarily have from 900 to 1,000 square feet of heating surface, or about 50 feet per ton of adhesive weight. Nevertheless such engines oftener fail for wan of steam than for insufficient adhesion. If, now, the whole weight of such a locomotive were placed on the driving-wheels, instead of part being carried by a leading truck, then the weight on them would be about 27 tons, and the heating surface only 33 square feet per ton. If the water and fuel were added, the proportion would be reduced still more. There is, of course, some reduction in the gross weight of a locomotive and tender when all their weight is carried on the driving-wheels, as part of the running gear and other parts are dispensed with; but it is impossible, with our present knowledge of boiler construction, to carry all the weight of the machinery, fuel and water on the driving wheels and maintain th proper relation between the heating surface and the adhesive weight. As we stated before, ordinary American locomotives fail much oftener for want of steam than for the want of adhesion, showing that 50 square feet of heating surface per ton of adhesive weight is at any rate not more than is needed, especially when a poor quality of fuel is used. A sufficient amount of adhesion of the driving wheels is of course requisite in order to pull heavy loads, but no amount of increase of this weight will move a train if there is not steam enough to turn the

The fact that in the trial the engine succeeded in pulling a heavy load up a comparatively short incline proves very little regarding its capacity on the long grades which it must encounter on the Mexican Railway. If engines of this kind should be obliged to "stop for steam" seven minutes, they would certainly not be very efficient on roads with long and steep grades. We do not know how it is proposed to provide the requisite amount of heating surface and steam-generating capacity; but that it is a defect in this plan of engine a glance at the figures will show, and if a demonstration is needed the trial of the Mexican engine has furnished it.

There will also be another difficulty which would be quite a serious one with engines of this kind on new roads with comparatively few water stations. We refer to the small capacity of their water tanks. American engines of the type we have described are obliged to carry 1,800 gallons of water in their tanks, or 100 gallons for each ton of weight on the driving wheels. If the Mexican engine carried the same relative quantity, it would require tanks with a capacity of about 6,200 gallons of water. The same thing is true of the supply of coal. If the adhesion of an engine is increased it can pull a greater load, but the consumption of steam, water

and fuel is also increased in the same proportion.

The remarkable feature about this locomotive trial is that an engine with a wheel-base of 29ft. 54in. could run with perfect ease around curves of so short a radius, which could only be done by engines built upon the double-truck system advocated by Mr. Fairlie. This advantage is, however, not confined to his engines with double boilers. The plan which he has proposed of carrying the water and fuel on one truck and a single boiler and the machinery on another, obviates many of the difficulties we have pointed out in the Mexican engine, while it has not the evil of a duplication of I to which very great objection has been made in this country. With a single boiler there is also much more room on the foot-board, and only one furnace instead of two, by which it is said the unfortunate fireman "was put out" during the trial.

It is to be regretted, we think, that in building an engine on this system, Mr. Mason adopted the double boiler, as our readers will remember he did in the "Janus," and not the single boiler, as he has since done on a 3-foot gauge engine which he has just completed and which, as most of our readers will remember, was illustrated in the GAZETTE. Will not some of our enterprising railroad companies give him an order for a loco motive of this kind for a 4ft. 81in. gauge road.

### The United States Rolling Stock Company.

This company was organized for the purpose of supplying rolling stock to the Atlantic & Great Western Railroad, the financial condition of which is such that it cannot easily borrow money for that purpose. After organizing, the opportunity of doing a general business of this kind with other companies seemed so good that the original scope was extended, and it is now proposed to supply engines and cars to any railroads which may need them and have not the requisite capital for the purpose. Locomotives and cars will be leased to roads, the payments to be made for the service or mileage of each

The stockholders of the company are almost exclusively English capitalists. The amount of stock sub-scribed is \$5,000,000, one half of which has already been paid in. The trustees are General George B. McClellan, S. L. M. Barlow, James B. Hodgskin, W. Butler Dun-can, Lawrence Wells (the latter of the firm of F. Schuchardt & Sons, of New York). The officers are: General George B. McClellan, President; S. L. M. Barlow, Vice-President; James B. Hodgskin, Treasurer; J. D. Barton, Superintendent. The office of the company is at No. 9 Nassau street, New York.

Contracts have already been made for thirty-four loco motives, and from seven to eight hundred cars, for the Atlantic & Great Western Railroad.

It is noticeable that the rolling stock which this com pany has under construction especially for the use of the Atlantic & Great Western is to be of the standard and not of the six-feet gauge, so that it may be regarded as certain that the gauge of this road will be changed or a third rail laid-a step which will be likely to put the line in a more independent position than it ha had heretofore, as it will be no longer dependent solely upon the Erie for a connection with the East, but can turn its traffic upon the Philadelphia & Erie, or, by the construction of no very long new lines, with other lines to New York and New England.

Rolling-stock companies have not been known hereto fore in this country, we believe; but in England, for many years, what are known as "wagon companies" have flourished and evidently been found useful. In this country, where there are so many companies of slender means which exhaust their resources by the time they have their tracks laid, it is reasonable to suppose that such a company will easily find customers. their wants have been supplied chiefly by existing railroad companies, which, however, have assumed the operation of the roads while supplying the rolling stock. Rolling-stock companies afford an opportunity for the owners of a line to operate it by leasing the rolling stock, instead of, as is common now, the owners of the rolling stock operating it by leasing the roads for it to

# A Coincidence-Improved Double Rail.

It is well known that inventions are frequently presented to the world simultaneously by two or more persons, who sometimes have had no communication with each other. Quite a curious instance

of this kind has recently come to our notice. The American Railway Times of January 6 contains a communication from T. Willis Pratt and an engraving of an "improved double rail," which we have reproduced on a smaller scale. Of this rail he says:

"The object to be accomplished is to make a continuous rail, as nearly perfect as may be, and to have as great a width of top and bottom surface as possible, without greatly exceeding in weight per linear yard the best sold or single rail in use at the present time.

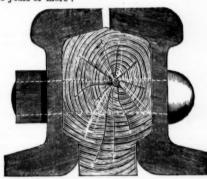
"Compound rails of two or more parts have been constructed and experience warns us that

parts used. parts have been constructed and used, and experience warns us that it is extremely objectionable to bring the several parts of such rails into immediate contact as iron on iron. The great strain to which the parts are subjected, the lamination or

ing the various patterns so that the parts may perfectly fit each other, cause the rivets to yield so as soon to become loose, or to break, and thus a rattling or grinding of the surfaces upon one another, more or less injurious, takes place, and the risk is incurred of sudden separation of the parts, which is liable to throw the trains off the track. It is proposed to construct a rail in the following manner, to wit: (see figure above) two equal and similar rails are placed side by side, inclosing in the hollow parts between them a core or tongue of wood. This core is intended to exactly fit the hollow parts of the rails and to be of sufficient thickness to keep the two side pieces a quarter of an inch or more apart at the top and bottom flanches. The whole is to be fastened together with screw bolts or rivets, whichever may be found best in practice. The side pieces are to break joints at one-half their lengths, and the wooden core at equi-distant intermediate points. Splicing or fishing pieces of iron to be used if necessary at each joint on the outside surfaces in the hollow of the rails.

"This combination is then in fact a double iron rail, being two distinct rails placed side by side, and kept from contact with each other by the wooden core, and yet bund together by the bolts or rivets. Thus is secured the qualities of a continuous rail with sufficient siffness or rigidity, combined with the elasticity imparted by having the parts pressed against a wooden surface."

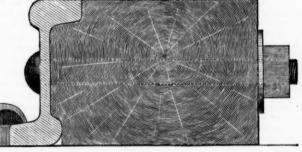
The engraving below represents a section of a rail of which we have had a model in the office for the past three years or more :



It will be seen that this embodies substantially the ame principles as that illustrated and described in the Railway Times, with the additional feature that the two parts are reversible, the top and bottom of each being exactly alike, so that when the heads become worn, they can be turned and the bases be subjected to wear.

While all this sounds quite plausible, the opinions of experienced men have not been favorable to the adoption of the invention. One of the chief objections to the plan undoubtedly is that three pieces are substituted for one. The number of bolts required would also be very great, and it would require a great deal of care and attention to keep them screwed up tight.

It has also been proposed to use one piece of the rail bolted to a longitudinal stringer, as shown below. The wood in this case would require to be heavier than in the other, and pieces 54x34 inches section were proposed for very light rail. One side must of course be cut to fit the rail. For cheap roads in parts of the country where iron is expensive and timber abundant, this plan might be substituted for what are called "wooden railroads."



Past experience has, however, not been very favorable to the use of compound rails of any kind, many of which were quite as promising as these which we have illustrated.

# Railroad Organization in the Late European War.

A recent review of four works by eminent authors, which appears in the Edinburgh Review, gives an account somewhat in detail of the organization of railroad transportation in the Ger-man army, and the important part it played in carrying on the sfully.

war successfully.

The review opens, after a few preliminary remarks, by stating "that the art of war has been changed, not so much by the new implements of destruction as by inventions whose object is commerce, and whose mission is peace." It is true war is no longer made up of hand-to-hand encounters, and the breech-loading weapons have done much as instruments of destruction. Everything is enlarged, distances are quadrupled, and the telegraph has to be used to perform the office of the general's own excrushing of the top surfaces by reason of the great thing is enlarged, distances are quadrupled, and the telegrap weights which pass over them, and the difficulty of form-

All operations in war are regulated by a country's power of provisions and other munitions of war. By the use of railroads a very large body of troops can now be concentrated on one point, and the loss from stragglers and delay of marches, fatiguing in themselves, is entirely obviated. An important point, the supplies, can keep pace with the army, be its movements ever s rapid, and the area from which they are obtainable is increased enormously, making the army independent of the country in which its marches and operations are being carried on. The damage to provisions is much less also the cost. An army of can be supplied at a distance of 400 miles from the depots of provisions by one train in 40 hours, which would re quire 30 days if horses were used, and a much larger supply of men to manage the wagons. Before the war the railroad organizations had been worked up in Berlin by a mixed committee of staff officers and employees of the Ministry of Public Works. decided that on single-track roads twelve full and twelve vertains should be run daily, and eighteen full and the same They decided that or number empty on the double-track lines, besides about h number of freight trains were also to be passed over the tracks. The speed adopted was 12 miles an hour, including stoppages. For this, the Germans employed 3,500 railroad officials. The Prussians have considered the military bearing of all the roads built, and the details are constructed with direct reference to the transportation of troops. As an example of the thorough working of the system, the German armies were placed on a complete war footing, concentrated on the French frontier, and all the or tooling, concentrated on the French Property, and an encopplies forwarded, in a space of fourteen days. Another great nt to be gained is the quick removal of all wounded men, and their rapid transportation to their homes or to hospitals, in a much easier manner than could otherwise be done. This adds to the soldier's confidence and the general's freedom of operations. Prisoners can also be removed, relieving a large numb of men otherwise employed in guarding them. Each body troops in the Prussian army had a field railroad division attached Each body of to it, either to build or destroy roads in the most rapid manner. The telegraph helps materially, reporting daily what provare necessary for certain bodies of troops, which then can be warded by rail. Behind the Prussian armies a most efficient system was organized of "supervising the lines of communica-tion." Each inspector and sub-inspector knew daily every detail and telegraphed it direct to Berlin, thereby keeping up a thorough communication between all parts of the armies. A surgeon was attached to this organization, who attended to the transportation of the sick and wounded from the field to the cars, which were furnished with all necessary comforts. A field post-office was also a part of this complex system, as well as the telegraph department. These arrangements which we have indicated enabled the Prussians to act as a great machine, perfect in all its details, but which none could have operated successfully without the aid of the railroads. The moral effect upon the individual soldier of these arrangements cannot be estimated. It gives him confidence in his chiefs, and therefore confidence in himself. The French General Chanzy admits that the cause of their defeats is directly traceable to their lack of military organization. The Prussian, with his system, was certain of his information; and the general sitting in his office, with a map before him, was enabled to control all the movements of the vast bodies of troops. The railroad and the telegraph were of far greater utility than any new instru-ments of destruction; and it has been proved that no nation can successfully go to war with Prussia until it has mastered the details of this organization, and trained officers and men alike to rely solely upon it. In reviewing a review much must necessarily be left out which exemplifies and demonstrates the principles; but we have attempted to indicate the chief points without going into details on any of the subjects.

We have, perhaps, said enough to enable the reader to grass the outlines of the great system and understand the wo handle an army in the field. all its details would not, perhaps, apply to our own country, the greater distances and, in some districts, the want of sufficient greaser unsances and, in some districts, the want of sufficient railroads, making many differences necessary; but it shows that the remark of Von Moltke was not so much out of place when he said, on being asked if he had read anything about our late civil "that he did not care to study the fights of two unorganized mobs.

# Safety of the Train-Dispatching System,

ndent of The Telegrapher who writes over the signature of "Grand Trunk," commenting on the criticism of the American system of train dispatching made by a contributor to the RAILROAD GAZETTE recently, affirms that "in the hands of competent employees" the system is entirely safe; that he has ret to hear of a single accident that can in any way be charged to the system "where the system was properly carried out." closes by saying:

urse the system 'has no check in itself' on drunken "Of course the system 'has no check in itself on drunken or innefficient employees, or broken rails, land slides, snow drifts, etc., but these are matters entirely out of the jurisdiction of the 'system,' and ought not to be laid to its charge. In conclusion I have only to say, give me a good working line (compound wire and Brooks insulators) and a set of faithful, steady employees, and I am willing to risk my head on any accident that may occur from dispatching—and this not from any confidence in myself as a dispatcher, but from my perfect confidence in the safety of the system."

The Superintendent of Telegraphs of an extended system of railroads, in a private letter to the editor, says:

"The more I think of the subject, the better satisfied I be-

come that there is need of a further sheek upon the American system of train-dispatching. \* \* \* I do not believe there is a train-dispatcher in the country who has not at some time is a train-dispatcher in the country who has not at some time made a bad blunder. Of course these things are not frequent, and in most cases accidents are escaped, but not from the dis-patcher's carefulness. I fail to see in the Indian system, as thus far elucidated, that perfect safety and celerity which we

The subject certainly deserves the most careful consideration from railroad men, and we hope that the discussion will be continued, and especially that those who can suggest improvements in the system will make them.

### Meetings in March.

The American Society of Civil Engineers. No. 63 William street, New York. Wednesday, March 6, at 8 p. m. Papers will then be read by Messrs. Brooks, Ellis and Francis. Wednesday, March 20, at 2 p. m.

The meetings of this society are for members only. The New York Society of Practical Engineering. Geographilrooms, Cooper Union. Wednesday, March 13. Open to the public.

Polytechnic Association of the American Institute. Cooper inion, New York. Every Friday evening, at 8. Open to the

#### Cantribution.

#### NOTES ON THE MANAGEMENT OF AMERICAN RAIL ROADS.

BY A HINDOO.

[CONTINUED FROM PAGE 82.1

Absence from headquarters has prevented my seeing, until to-day, the communications of "America" and "X" in the RAILROAD GAZETTE of February 17, and of "An Eastern Railway" in the issue of the 24th. now shy at three birds with one stone, and so have a better chance of making a hit. Of the three communica-tions the one from "X." is the most deserving of attention, as it is evidently the production of a thinking and an experienced man. I should say he holds a controlling position.

Before taking up the gauntlet, let me make a solemn confession: I am not acquainted with any recorded "system of American train-dispatching." I judge from the manner in which the business is carried on and from scattered rules I pick up here and there. I see the prac tice, but have not been taught the theory. Indeed, I begin to suspect that there is not any acknowledged system, but rather that each road has one of its own understood if not expressed. Of course, I may be altogether wrong, for, as "America" remarks. my "conclusions may be drawn from a defective execution of the system and not from any fault of the system itself." X" says rules have been laid down, and gives some of the chief ones. If "X" will send the editor a complete set of rules, I am sure room could be made for them, and more than I would gratefully profit thereby.

"X" admits that the Indian system is safe. ca" thinks otherwise; for, he says, there is "less liability" under the American plan. "X" says: "Can all be as safe by any other system which may be more economical?" Aye, there's the rub! "X" will remember I admitted that the American method insured the greatest dispatch possible, and at first sight appears the most eco nomical, but that it did not secure the highest degree of safety attainable, and therefore also might not be the most economical. If my memory does not deceive me, I asked what internal safety checks the American system provided. Whether it was a self-regulator? No one has answered this. From the three communications before me, and from my own observation, I conclude that there are some unimportant checks; but that the most delicate movements of the machinery are not protected from derangement. For instance:

Precaution No. 1 .- The conductor's understanding of the order must be telegraphed to the head officer, and the response "correct" telegraphed back from the head office to conductor and engineer. The two telegrams are then indorsed "O. K." by the operator, signed by him, and at last given to the conductor.

Here we have a complicated arrangement of mes writing and re-writing, the conductor waiting in the of fice all the while. For what? To make certain that the conductor understands his order! Are the orders then so complicated, so enigmatical, that there is a chance of their being misunderstood by men of such calibre as conductors should be? I should like one of my friends to let me see a sample of these things so hard to be understood. don't believe the business admits of such, if the dis patcher understands the language he uses. Now it eems to me that the risk of misconception lies be tween the two operators, and nowhere else. If the receiver, after entering the message in his book, telegraphs back word for word what he has written, there can be no misunderstanding. The receiver then prepares a copy, which he signs with his own name. conductor comes along, compares his copy with the book, signs the book at the foot of the message, and goes off without delay. Here is an arrangement that causes no detention, and is so simple that there is small chance of its not being carried out. What is the practice of the

other arrangement? The conductor writes, as his understanding, an exact copy of the order. Where is the check? It is a farce, and one that is not always played With a heavy traffic it will often happen that quite a number of conductors are at the same time waiting for their "corrects." Some must be detained unnecessarily long. But if, as I suggest, the receiver telegraphs back and he cannot be attended to just at once, there is no

Precaution No. 2.-Every order to a conductor cludes with "Ans. 31." Where is the necessity for this? If it is an invariable rule that conductors are to write their understanding of the orders, why remind the man each time? Why shift the responsibility from the conductor, where it should rest, to the dispatcher, where it should not rest? The dispatcher cannot prevent the conductor's leaving without having gone through the sual forms. The conductor is the only one who can be held responsible for this. But if the dispatcher should forget at any time to affix the formula, and the conductor went without having his understanding telegraphed back and acknowledged, and an accident happened, on whose shoulders would the blame fall? Surely not on the conductor's. From the repetition of the formula with each order a proper inference is that there is no fixed rule about it, and when the order "Ans. 31" is not given, no action is required.

Here we have complicated precautions where there is no danger, but where there is the greatest danger we have none. For example, "Conductors when directed by an order of this kind to run must not leave a (the?) station without having the same in their posses (Vide "X.") Nothing said about the driver. How would that work? Train No. 1 has right of way. At station B, gets an or 'er to pass No. 2 at C. Comes out of the office laughing or talking, does some shunting, forgets to communicate order to driver, gives the starting signal, and away they go through station C and into No. 2 just beyond it. Or perhaps conductor has orally communicated the order to driver, who misunderstands or forgets it; and so the accident happens. C may not have been advised or may not be a telegraph station, so no stop signal is displayed.

Example No. 2—A wild train is to be run against a regular train to pass at C. (Vide "X").—Dispatcher orders C to "hold." C replies "held," but forgets to turn on the signal; being either half asleep or "not himself;" no-body knows the difference. Past flies the regular train something happens.

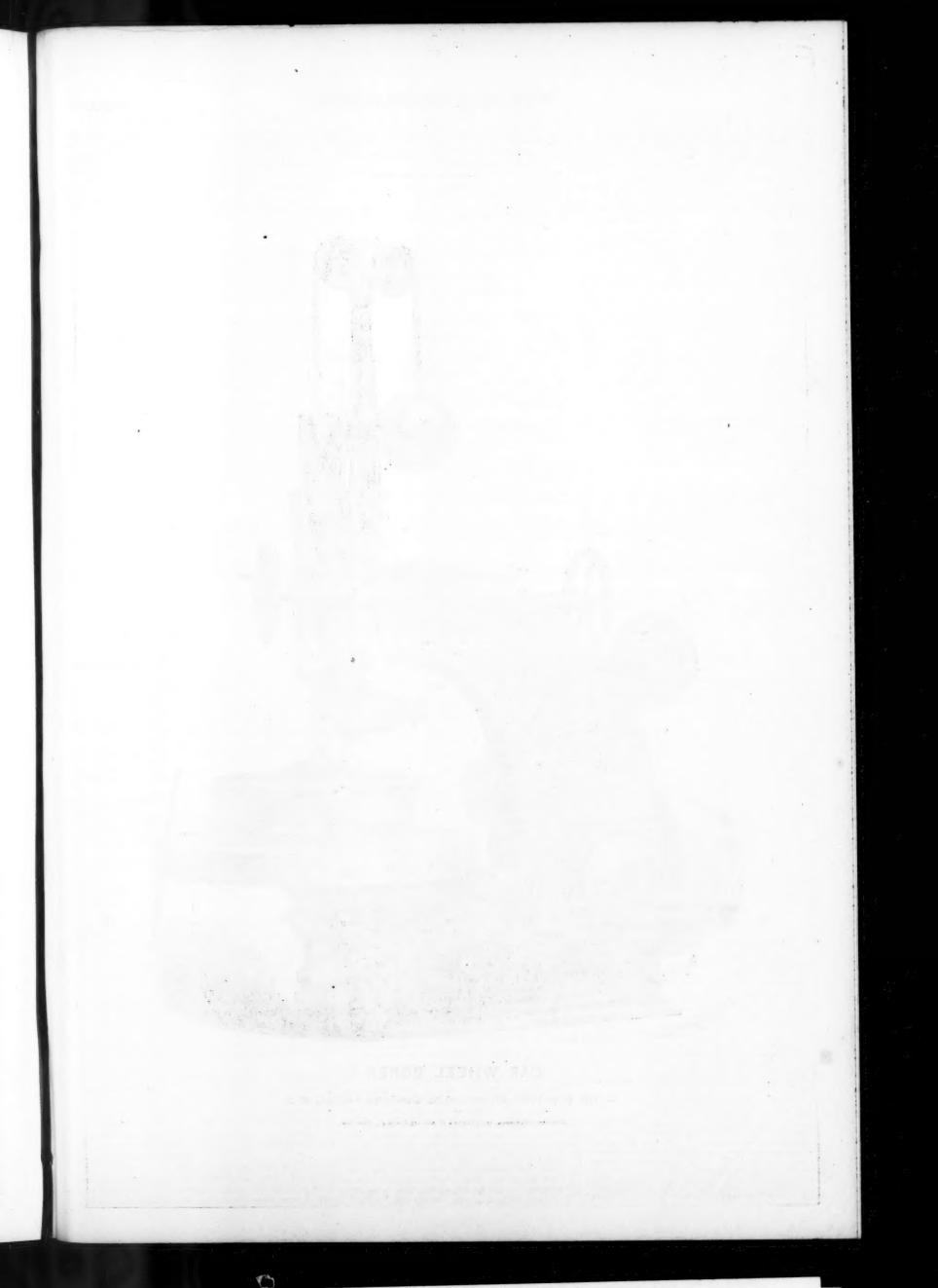
Example No. 3-(Vide "An Eastern Railway").-Dispatcher telegraphs to Conductor Express No. 1 North, I have given freight No. 2, bound south, until 10:40 a. m. to make B for you. Do not pass that station before that time unless it has arrived; then go by rule. Ans. 31." Conductor obeys this order literally. No. 2 left A. in good time to make B by 10:40, but engine becomes disabled or leaves track or sticks on a grade. At 10:40. No. 2 not being in sight, No. 1, according to order, starts and goes " by rule " into No. 2.

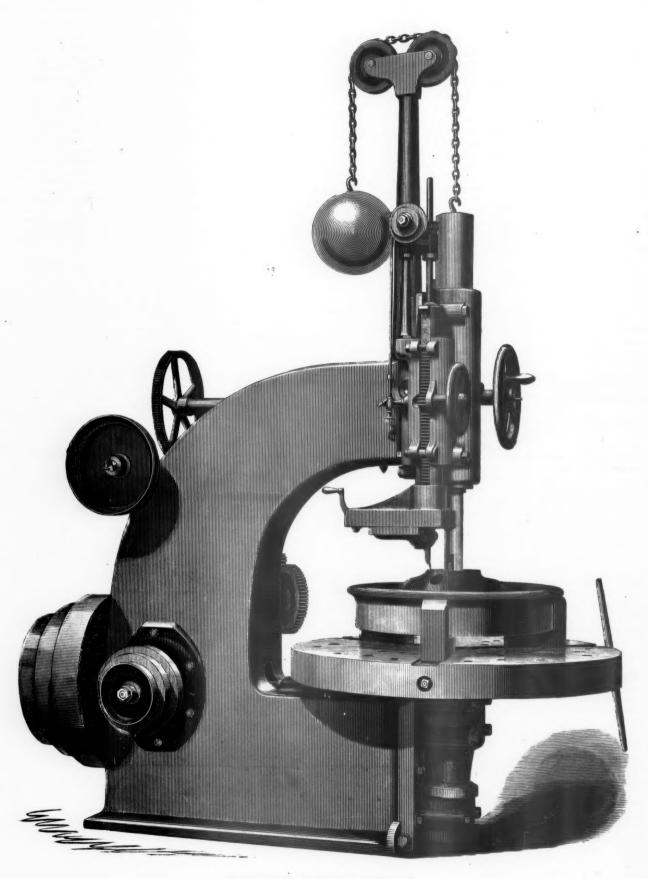
Example No. 4-(Vide "An Eastern Railway") .- "The order must always be issued first to the train having the right of road." &c. But the dispatcher momentarily forgets the right of way, and gives the right to the opposing train; then cannot get the other operator in time to hold the train. What happens?

I might give other instances, but these few will take as much space as you can spare, and I am much pressed for time just now, but will return to the charge again. Just before writing the article which is now being commented upon, one butting collision came to my notice. Since that I have heard of no less than seven, six of which were mentioned in the newspapers, viz. : Rockford, Rock Island & St. Louis, Chicago & Northwestern, Pittsburgh & Connelsville, Ohio & Mississippi, St. Louis & Iron Mountain, and one at Georgia Station, Indiana. All, I understand, were butting collisions, most of them very serious, causing loss of life and great destruction of property. The last mentioned was a double event—two freight trains collided, and before proper signals were got out, an express passenger came along and got mixed.

Eight collisions within a month! My means of obtaining information is limited, so I do not take that number to be the full complement during that period, and the escapes we know nothing of; although they tell every bit as heavily against the system as actual col-Your other correspondents probably know more about the facts connected with these accidents than I do. The presumption is in my favor against the system. The advocates on the other side have on them the onus of explanation. I am curious to know what they will say.

Understand me when I declare that in my opinion no system can be safe if it leaves important movements altogether in the hands of one man. The very best man living is liable to err. Sins of omission are common to us all. The vagaries of intellect are occasionally so astonishing that after an event the man wonders whether





CAR WHEEL BORER,

BY THE NEW YORK STEAM ENGINE COMPANY, PASSAIC, N. J.

Office and Warerooms, 121 Chambers St. and 103 Reade St., New York.

he was mad or not at the time of its occurrence. If this be so with the best, how is it with the common run of How is it with the inefficient men appointed to their places by favoritism or carelessness or in ignorance of their characters? How is it with men who, in their normal condition, are bright, but, under certain conditions, are stupid and unfit for work? How is it with those who, from carelessness or otherwise, having made a mistake, slight in itself, perhaps, are unwilling to acknowledge it, and so undertake to run a risk, hoping that all will be well?

These considerations apply equally to superintendents, train dispatchers and subordinates. All are men. I am inclined to say that in a delicate maneuvre, the concurrence of two men is barely sufficient to insure accuracy certainly not unless the two are widely separated by in-

terests and circumstances.

" X" agrees with me that every detail of a system must be carried out faithfully or it cannot be safe; will he not also agree with me in the consequent deduction that a system which does not provide machinery to insure its faithful execution cannot be safe? Has the American system such a provision? I think not. A system of inspection is absolutely necessary to enforce the provision of any code.

X" joined issue with me as to the com parative safety of the two systems. I believe he will see now that his ground is untenable. The Indian system is absolutely safe, against even unintentional error. The American sys tem lays the safety of life and proper y, frequently and at the most critical moments, entirely in the hands of a single individual, who cannot be infallible. I hope "X" will have the grace to own up and oppose me on grounds where he has a better chance—say, expediency, ec dispatch, etc. The Indian system is cumbrous, I admit, and not capable of quite such dispatch as the other; but I think under good management the difference in that respect might be very trifling. A combination of the two might be devised. The Major Taylor referred to by "X," if I remember aright, was a Madras government consulting engineer, and did get some such system intro duced. I was in the upper provinces, and am not aware of the results; but am quite confident that with the personnel of an Indian staff the practice of American roads, if introduced there, would close any road in six months. The skill and energy of the drivers in this country cannot be too well spoken of. The public may thank them for many a safe ride that otherwise might not have been so enjoyable. In India I adopted a combination of the two systems; that is to say, that without interfering with the working of the established system, from my office I took a bird's eye view and stepped in when necessary to stay the pro gress of any train, so as to avoid those jams and compli-cations which "X" very rightly points out as possible if no supervision is exercised; but this was experimental, and I left before it became part of the system.

One word more. As to "order signals," I think the signal-board should be weighted so as to be always against trains except when taken off to permit their pass that it should not be taken off until drivers whistle for it. and that drivers should report every case of its being found off before their whistle. This compels operators to be on hand and alert during the passage of trains, and prevents their forgetting or neglecting to turn on the signal when ordered to "hold."

[TO BE CONTINUED.]

# Car-Wheel Borer.

The almost universal use of cast-iron car wheels in this country has made it necessary to provide special machines for boring them out to fit the axles. Our engraving represents the machine which the New York Steam Engine Company is now manufacturing for this purpose It is provided with a universal chuck, with case-hardened wrought-iron jaws for holding the wheels on the table in a position concentric with the boring spindle. Besides the ordinary self-feeding attachment for the boring spindle, this machine has an improved self-feeding attachment for facing off the hubs. This is placed alongside the boring spindle and is clearly shown in the engraving. The face of the hub can thus be turned off at the sam time that the hole is being bored out.

On the side of the machine opposite to that shown in the engraving is a crane for lifting the wheels to and from the table. Only the gear wheels of this crane can be seen in the illustration. It is so arranged that it will swing under the boring spindle to the center of the chuck or table, so that a wheel can be put on or removed from the machine with the greatest facility and without danger of injuring the jaws of the chuck.

The boring spindle is counterbalanced by a ball and chain, as is clearly shown in the engraving. The spindle in which the table revolves has an attachment by which it can be inclined from a vertical position, so as to bore

tapered holes. This is done by a screw, the head of which is shown on the lower front corner of the frame.

Patent hollow self-oiling counter-shafts and steel wrenches are furnished with each machine. The former, it is said, will run twelve months without requiring to b re-oiled. The engraving, which is a work of art by Chauncey Wright, shows that the design is very tasteful, and an inspection of the machine itself would, we think be equally conclusive in regard to the quality of the workmanship.

The New York Steam Engine Company, of No. 121 Chambers street, will furnish any further information concerning this machine.

#### How the Doctors Disagree.

At the meeting of the Institution of Civil Engineers of Ireland on January the 10th, Mr. Burdon B. Stoney, the President for the ensuing year, delivered an inaugural address, in which he made the following reference to the narrow-gauge system:

"As regards railways in Ireland, it seems clear that here cannot be any very rapid extension of either main r branch lines in the future, for the industry of the country is not sufficiently manufacturing to make it kely that such enterprises will meet with much encour-

likely that such enterprises will meet with much encouragement.

"There is, however, a certain opening for cheap railways, and this subject has much engaged the attention of engineers and others since the success of the Festiniog line has awakened attention to the subject.

"The action of the Indian government in determining to make the meter a standard gauge in India seems certainly a move in the right direction; for it appears very absurd to introduce costly wide gauges into poor countries when narrower ones have been found sufficient for the wants of the richest and most industrious nations in the world.

countries when narrower ones have been found sufficient for the wants of the richest and most industrious nations in the world.

"It is now becoming gradually understood that a frequent service of light trains affords greater accommodation to the public and a greater inducement to them to encourage railway traffic than heavy trains at long intervals; and as it generally happens that a great portion of a railway staff must be employed, whether the trains run frequently or not, and as a large proportion of the cost connected with the railways is in no respect, or scarcely at all, dependent on the number of trains, it follows that the expense of a railway worked with frequent light trains, compared with that of one worked with few and heavy trains, will bear a very different ratio indeed from that of mere relative number of trains.

"There are few intelligent minds that have considered the subject carefully who will not acknowledge that a meter-gauge, similar to that which is now so wisely introduced into India, where it will, probably, ultimately supersede all other gauges, would, if originally made the gauge of Ireland, have given all requisite facilities for traffic, and have paid a considerably larger percentage of dividends to the shareholders, as well as have been further extended throughout the country than the present gauge of 5 feet 3 inches. It may be too late to go back on the past, but it is probable that future branch lines will, to a great degree, be constructed either on a narrow gauge, or, if the standard gauge is maintained, with a much lighter permanent way and lighter rolling-stock than those adopted on the main lines.

"Both systems have their able advocates among the members of this institution, and I trust they will bring the question forward, illustrated by statistics and acquired experience, which alone can render material assistance in deciding the relative merits of such questions. A few general considerations, however, may not be devoid of interest. The bets noir of the narrow gauge is t

"For instance, with such traffic as coals, there is no great difficulty in making the bodies of the narrow-gauge coal trucks to lift like boxes off the frames, to be hoisted by suitable cranes on board the larger trucks, as was formerly the practice with the diligences in France, when passengers were conveyed partly by rail and partly by a diligence that was separated from its wheels, and then mounted bodily on a railway truck in the course of a very few minutes, without disturbing either baggage or passengers during the operation.

mounted bodily on a railway truck in the course of a very few minutes, without disturbing either baggage or passengers during the operation.

"For bale goods this may not be equally desirable, and they may, perhaps, be better transmitted, as passengers' luggage and parcels now are, by hand from wagon to wagon; and the expense of this will be less than at first sight may appear, for there must always be a certain staff of men available at junctions who might just as well be employed at this work as in doing nothing, which frequently forms their principal occupation for several hours during the day.

"Some persons have imagined that it would be necessary to have a special local repairing shop for narrowgauge engines and wagons, but this is altogether a mistaken notion; nothing can be easier when a heavy repair is required than to hoist the little wagon or engine on a broad-gauge truck and run it up to headquarters, where the principal workshops are situated. The great thing to dread with a light branch line of the ordinary gauge is the tendency of traffic managers and directors to work it with the heavy, worn-out rolling stock and engines which are not considered good enough for the main line, and gradually the system will drift into that adopted on the latter, when nearly all the advantages supposed to be derived from the cheaper kind of railway will disappear, and the state of affairs will gradually become much the same as we find along our present branch lines, with this additional demerit, that the unfortunate engineer will

come in for a large share of obloquy from every side from the traffic department and directors because specia rolling stock is required, and, when this objection i removed, from those pecuniarily interested, because the commercial result fails to meet their anticipations."

We have also received a copy of the address of Thomas Hawksley, Esq., on his election as President of the Institution of Civil Engineering in London, in which he refers to the meter gauge which has been adopted for India in the following language:

"The existing railways of India are now both extensive and important, and at present possess the advantage of an uniform gauge of 5½ teet. This audience will therefore be surprised to learn that this existing uniform gauge is now to be departed from, and that upon the obviously crotchety suggestion of some unknown individual the French meter gauge of 3 feet 3½ inches is in future to be employed.

French meter gauge of 3 feet 3\frac{1}{2} inches is in future to be employed.

"In India, then, is about to be introduced the very evil consequent upon the absence of uniformity of gauge from which the wise and deliberate action of an experienced private enterprise in England is now busied in effecting our emancipation; and also to be initiated, for no useful purpose that I can perceive, one of the worst-founded and most perplexing measures of length with which it has been my fortune to become acquainted. A measure which bases its claim to universal acceptance on the intangible ground that its length is, by its own unprovable assertion, exactly one ten-millionth part of a quadrant of the earth's equatorial circumference!

"The introduction of the French metrical standard into India might indeed be possibly justified on the ground of expediency, if England had previously adopted it, but till then I shall venture the assertion that to attempt to force upon the Oriental mind a novel system, and the labor of acquiring what will be to it an uncouth jargon, is as injudicious as it certainly will be unsuccessful.

"Nor can I conceive on what sufficient grounds it is

pargon, is as injunctions as it certainly will be talsacticessful.

"Nor can I conceive on what sufficient grounds it is being attempted to introduce the measures of France into use in this kingdom. The English unit of length, the yard, is just as capable of being referred to a natural standard as is the French unit, the meter; while the English unit, either as the yard or the foot, has been adopted and is used by far more millions of people than are now using the French unit. In Russia, in the United States, in Canada, in the East and West Indies, in Australia, and throughout the British colonies in which the English language is spoken, the established English neasure of length is exclusively employed, and these are the countries in which fully four-fifths of the commercial business of the world is carried on. Nor does the tenfinger system of decimals, frequently employed as an the countries in which fully four-fitties of the commercial business of the world is carried on. Nor does the ten-finger system of decimals, frequently employed as an argument in favor of the introduction of the meter, con-fer any advantages which are not more than counter-balanced by its disadvantages."

# Proposed Uniformity of Locomotives in Germany.

At the last sitting of the Berlin Association for the Improvement of Railways, Herr Weishaupt in the chair, Herr Kaselowsky, after explaining the number of different sorts of locomotives at present in use in Germany, drew the attention of the meeting to the expediency of introducing a normal engine for all the German iailways, which were now so rapidly increasing. In 1850, when there were only 637 German (3,185 English) miles of railway open, the traffic was carried on by 752 engines, while in 1869 there were 3,590 German (17,950 English) miles open, which were run over by 9,072 locomotives; the construction of these for the mail, passenger and goods trains on each of the railways differed from the others in many material points, and without going so far as to maintain that the engines might be of uniform construction for all railways, yet he was perfectly convinced of the possibility of making for the passenger trains as well as the goods traffic an engine suited to the requirements of all the German railways, with a few exceptions in which there were abnormally sharp curves or steep gradients, and these might all be included in three or four different models. The only alteration, perhaps, that might be found necessary was in the construction of the grates, on account of the different qualities and properties of the various sorts of coal used as fuel. The experience gamed by the late war went to show that locomotives could be used with the most favorable results on railways on which they were never intended to run. The reason of there being such a number of different descriptions of engines in use he ascribed to the fact that each directorate selected those that, according to their own judgment and experience, were best adapted to the requirements and peculiarities of their ber of different descriptions of engines in use he ascribed to the fact that each directorate selected those that, according to their own judgment and experience, were best adapted to the requirements and peculiarities of their own lines, but without any consideration of the adjoining ones, or of improvements in the construction of the machinery. The disadvantages accruing both to the makers and the railway managers from the continual discoveries and variations were very great, as the average cost of an engine of a new construction, including the preliminary expense of the experiments to be made with it, to see how it will work, amounts to from two to three thousand thalers. For the smaller companies who only order a few at a time the loss will be proportionately greater, as they have to bear the expenses of making these experiments with each order they give. At the same time, it prevents the manufacturers from working to prepare a stock on hand when business is slack, as they cannot know beforehand the dimensions of the different parts required for the engines ordered. On the other hand, it would be easy, after agreeing on certain principles, to construct them at a cheaper rate and with greater rapidity, and by having new pieces in reserve, to prevent the long delays occasioned by their being under repair, when they are unable to earn anything and cause great expense. It would also have the practical advantage of enabling railway companies to assist each other under a pressure of traffic by the loan of a locomotive. He was not prepared to admit that the introduction of such a model

engine universally agreed to after due reflection and mature consideration of persons adequately competent to decide on the mode of construction would put an end to the exercise of fertility of talent for improvement on the part of engineers and technical workmen; but rather that, with the knowledge and experience already gained by them of the requirements of the present day, they would be perfectly able to construct one or more of such model locomotives, which, if demanded, might be made would be perfectly able to construct one or more of such model locomotives, which, if demanded, might be made to run on trial on the different lines to see that they answered before the definitive order be given. At the next meeting of the technical officials of the Union of German Railway Managements these models would, of course, come under discussion, the defects be brought to light, and the alterations for their improvement suggested.

A debate on the research

A debate on the proposal then ensued, in which several of the members present took part. Herr Hartwich pointed out that it was just in consequence of the continual alterations and improvements in the construction tinual alterations and improvements in the construction of rails, engines, carriages and wagons that they had all been brougat to their present degree of perfection without becoming dearer, and he was decidedly of opinion that it would be going too far, and have the effect of shutting out further progress were they to introduce the principle of normal uniformity; besides which he did not believe that the makers would sell them the least cheaper. The Chairman remarked that for a long time past the influence of the government had been directed toward a simplification and greater uniformity in the working of railways, but without excluding further improvements by insisting on normal models; and it was only quite lately that a similar decision was taken with reference to goods wagons. It would be quite enough to lay down

lately that a similar decision was taken with reference to goods wagons. It would be quite enough to lay down some general fundamental principles and revise them from time to time. There was no doubt a remarkable and very apparent tendency since 1867 to construct locomotives on one model, more particularly in the endeavor to employ to the very utmost the whole weight and power of the engines, as manifested in the system of coupling locomotives for all descriptions of trains. Herr Malberg and Herr Hennig both strongly objected to the proposed system of normal engines, the former adding that he considered it a theoretical proposition that would be difficult, if not impossible, to carry out in practice.

practice.

Herr Schwartzkopft was in favor of the idea, and con-Herr Schwartzkopft was in favor of the idea, and confessed he could see no reason to fear any diminution of mechanical improvement and invention from the introduction of a normal locomotive; but he was of opinion that the first step should be to agitate for uniformity of the axle-trees and wheels, which might be brought about by an agreement between the leading railway companies and the directors of the principal factories, so that it might be possible to get the engines cheaper, and they would then be able to run on all the railways, and thus prevent the dearth that was so generally complained of lately on all the German lines, and nowhere more so than in Alsace-Lorraine, where the local railway traffic was for the time nearly annihilated.

Herr Borsig, the head of the great factory at Berlin for making locomotives, was partly inclined to take this view of the case, and admitted the possibility of constructing the engines at a cheaper rate; but still he believed that progress and improvement would not be increased but rather checked by such a measure as the one

proposed. proposed.

Several members supported the view that uniformity in their park of wagons would be infinitely more useful and advantageous than uniformity of construction in the

and advantageous than uniformity of construction in the locomotives, as the latter were only intended for the special use of particular railways or sections; whereas, were the wheels and axles of their carriages and wagons made on one model, and of the same pattern, weight and dimensions, they could run over the whole network of German railways. Above all things, however, the first thing to do was to ascertain the wishes and suggestions of the makers themselves with regard to a uniformity in the construction of locomotives.

In closing the discussion, and before proceeding to the consideration of the next subject on the list, the Chairman observed, with reference to a remark that had been made by one of the speakers, that the reason for the great scarcity of engines on the railways in Alsace-Lorraine was not owing to a want of normal regulations, but that the great factories had so many pressing orders for new engines on their hands that they were unable to execute them all at once, and therefore delivered them over in the chronological order in which the contracts were signed.—London Railway News.

# The Draw-Span of the Davenport Bridge.

The Draw-Span of the Davenport Bridge.

The great draw-span of the new bridge over the Mississippi at this point was circled or turned for the first time at noon yesterday. It is the longest draw-bridge on the Mississippi, and the heaviest in America, if not in the world. Yet ten men pulled it round quite easily, with the aid of a single pulley, heavily loaded with lumber from end to end though it was. Such of our readers as have not had an opportunity of examining this great work will be interested in a description of it, although no description can convey an idea of its tremendous strength. The draw-span as it stands is a Wh pple truss inverted; that is to say that its top chord is in tension and its bottom chord is in compression, which is exactly the reverse of the style of the fixed spans of the bridge. The whole strain of the draw-truss is carried right to the center from the ends, while in the fixed spans the strain is transmitted from the bottom of the posts up to the tie-bars to the ends, throwing the top chord into compression. The draw is, in exact figures, three hundred and sixty-six feet and one quarter of an inch in length, the panels being 17 feet 2 inches in length and the posts 46 in number. The posts, to be particular, are connected by top and bottom chords, top and bottom struts and diagonal lateral bracing. The weight of the iron in the span, exclusive of the turntable; is \$71,784 pounds, or about 426 tons.

The turn-table is a new invention of C. Shaler Smith,

President and Chief Engineer of the Baltimore Bridge Company, and this is its first application. It differs ma-terially from any other work of the kind. In describing it, we will commence with the bed-circle itself, resting on it, we will commence with the bed-circle itself, resting on the center or pivot pier. The circle is 32 feet in diameter, and is composed of six segments, each 8 inches deep by 12 inches wide, and weighing six tons—36 tons for the circle. The top surface is beveled, the inner side of the surface being highest. On this bed-circle are mounted 36 heavy cast-iron wheels, 2 feet 6 inches in diameter, with a 12-inch face; through the center of each wheel is placed an adjustable tie-rod, which runs to the center-pin as a radial bar; the wheels are also spaced at correct relative distances by an inner and outer set of distance-plates, which, with the radial rods, regulate the distance and travel of each wheel in the circle. The wheels are cast, turned and faced up to a bevel exactly corresponding to the bevel surface of the lower bed castings, but placed with their greatest diameter on the outer side of the bed-circle, thus giving to each wheel an enlarged circumferwith their greatest diameter on the outer side of the bed-circle, thus giving to each wheel an enlarged circumfer-ence to travel on the increased circumference of the outer side of the bed-circle over the circumference of the inner side. Thus each wheel, from its formation and the formation of the bed on which it moves, naturally tends to travel in a segment of the circle, and by avoiding the tendency which square-faced wheels have to travel in right lines or on a tangent escapes any severe tension on the center of the radial rods, consequently avoids the se-vere friction which would otherwise be inevitable. On the wheels above described is mounted a rotary table, formed in six segments, averaging five tons each, and formed in six segments, averaging five tons each, and five feet in depth, which are accurately fitted together at their joints, and secured by heavy keys and bolts, forming a circle as correct and solid as though cast in one impressions.

ing a circle as correct and solid as though cast in one immense piece.

On the exact radial center of the masonry is mounted a huge center-pin bearing, two feet eight inches high, with a base lour feet in diameter. Across the top of this and bolted into the inner surface of the rotary table are two cast struts or cross beams of immense weight (averaging six tons each) and great strength, which render the office of transmitting to the center-pin bearing and the rotary bed their correct relative proportions of the ponderous weight brought upon this strut by the main center post of the superstructure, the main posts being mounted upon heavy cast-iron shoes seated upon the main girder. Besides this girder or strut, crossing the center-pin and taking hold of the rotary table, there also radiate from the center-pin bearing and from the center of the main girder numerous struts and tension-rods of wrought iron, which serve the purpose of keeping at all times the rotary bed in correct tram or perfect circle from the fixed center. The exact weight of this turntable, exclusive of the power spoken of below, is 205,416 pounds—almost 103 tons.

The rotary power which is to turn this great drawbridge has rather a novel method of application, as any one can see.

ne can see.

Immediately over the center portal arch will be placed Immediately over the center portal arch will be placed a reservoir of wrought iron, to contain about three barrels of pure glycerine, which will flow down through tubing into four hydraulic pumps which will be worked by a steam engine placed on a level with the railroad deck and will be forced by the pumps into two huge "rams" or "jacks" placed on each side of the span at the center posts. From the plunger of each "jack" will be led a wire cable 1½ inch in diameter, so arranged that as the plunger of the "ram" on one side of the span is ascending and shortening the cable lead on his side, the other "ram" will be descending and passing out or lengthening his cable—and as one "jack" shortens the cable attached to it, he draws himself, and consequently the side of the span toward the point where the other cable attached to it, he draws himself, and consequently the side of the span toward the point where the other end of his cable is permanently made fast in the solid masonry of the pivot pier; and at the same time the other "ram" passing out or giving line on his side of the truss permits the span to rotate in accordance with the pull of the other "ram," and is prepared at a moment's notice to act as a brake, and entirely check the span, or to cause it to turn in an opposite direction.

Either "jack" can pull, and either one can hold back, as the supply and discharge of pipes at the top and bottom of each "jack" are arranged with a view to make them act as reciprocators.

tom of each "jack" are arranged with a view to make them act as reciprocators.

No fluid is lost by working, further than by leakages at joints and valves; while the hydraulic pumps are intended to be worked by steam power, they are also arranged for being worked by "hand power," in case of necessity.

The rotary power of this draw has been designed with an especial view to perfect simplicity and durability, and avoidance of use of gearing of any kind; nor is there anything new or scientific in the plans adopted.

The rotary power and table cost the Baltimore Bridge Company, in a special contract with G. B. Allen & Co., of St. Louis, the sum of \$18,000.

The draw span was swung to place last night to admit

of St. Louis, the sum of \$18,000.

The draw span was swung to place last night to admit of its load of heavy falsework being carried on to span No. 5 for erection there, ready for the iron men when No. 4 is finished. Considerable small fitting up of machinery on the draw and on masonry at the abutment yet remains to be done before the span and masonry are a perfect finish.—Davenport Gazette, Jan. 25.

Canada Midland

Oanada Midland.

Mr. Shanley has the contract for the extension of the Midland Railway from Orillia to Mundy's Bay, the terminus of the line, on the Georgian Bay. The section between Beaverton and Orillia is to be pushed forward to completion by the middle of the coming summer.

Toronto & Muskoka.

This branch of the Northern Railway of Canada was opened last December from Barrie northward to Orillia, 22 miles, and is to be completed to Washago, 11 miles further, by July.

Toronto, Grey & Bruce. A contract for the section of this line between Gorrie and Wroxeter station has been awarded to Messrs. McKen-

# General Railroad News.

#### CHICAGO RAILROAD NEWS.

Chicago, Burlington & Quincy.
This company is rapidly laying track on the Prophetstown extension, and this section of the road will be finished to Clinton within a few weeks.

The Japs on their Travels.

The Japa on their Travels.

The Japanese ambassadors arrived in Chicago over the above road by special train on Monday atternoon, and were received in due form by the Mayor and a large committee of prominent citizens. The Japa rode around the city on Tuesday, and on Tuesday evening left for Washington in a magnificent special train over the Pittsburgh & Fort Wayne road. The arrangements for the comfort and convenience of the visitors could not be improved. The train was under the special superintendence and direction of Mr. W. C. Cleland, Assistant General Passenger Agent. Agent.

Lake Shore & Michigan Southern.

Lake Shore & Michigan Southern.

The business of this railroad was never better than at present. There are from 13 to 14 freight trains from this city every day. A large amount of building material is brought into the city by way of this road. Nearly or quite a 1 the Cleveland building stone, of which large quantities are being used and to be used, in rebuilding the city, come over it. The new passenger depot building for the Michigan Southern and the Chicago, Rock Island & Pacific companies is to be constructed of the Cleveland sandstone.

Pullman Palace for Company

Cleveland sandstone.

Pullman Palace Car Company.

No person has yet been selected to fill the place of Mr. Hughitt, late Superintendent of this company and now Superintendent of the Chicago & Northwestern Railway.

Mr. Pullman himself has been absent from the city for the company and has just returned.

Mr. Hughitt's successful weeks and has just returned. sor will probably be appointed within a short time

Chicago & Alton.

Mr. J. C. McMullin, General Superintendent of the Chicago & Alton Railroad, has just returned from spending several days on the line of the road. He reports the Mississippi River all right now, both at St. Louis and at Louisiana. The river is open at both points. At Louisiana the ice was about sixteen inches thick, an amount said to be unprecedented at that place, so far as is known. For several weeks past the river at Louisiana has been crossed upon the ice, passengers and light reight being transferred in that mode. Owing to the lack of bridges, both at St. Louis and at Louisiana, this company has labored under great difficulties and drawbacks during the winter. It is believed that these are at an end now. Chicago & Alton.

backs during the winter. It is believed that these are at an end now.

This company has declared the usual 5 per cent. semi-annual dividend, which is payable March 6, in New York at the office of M. K. Jesup & Co. The transfer books will be reopened on the 7th.

The leaving and arriving times of trains at Chicago are as follows, according to the latest time table:

as follows, according so the faster Leave. Arrive.

St. Louis & Springfield Express, via Main
Line. \*9:15 a. m. \*8:00 p. m. Line.

Line.

Kansas City Fast Express, via Main Kansas City Fast Express, via Jacksonville, Ill., and Louisians, Mo. Wenous. Lacon & Washington Express (Western Division).

Joliet & Dwight Accommodation

St. Louis & Springfield Lightning Express, via Main Line, and also vis Jacksonville Division. \*9:15 a. m. \*8:00 p. m. 

Except Sunday.

Daily, via Main Line, and daily, except Saturday, via Jacksonle Division.

Daily, via Main Line, and daily, except Monday, via Jacksonle Division.

‡ Except Saturday.

Personal.

Mr. John C. Gault, since his resignation of the position of General Superintendent of the Chicago & Northwestern Railway, has been absent in New York. On Monday last he was in Boston. He is expected back on Thursday to formally deliver up on the first of March to his successor the insignia of his office.

La Salle & Chicago.

La Salle & Unicago.

A citizens' meeting was held in this city last week to protest against the proposed granting of the right of way to enter the city to the La Salle & Chicago Railway Company. From the report of the meeting it appeared that the citizens hardly knew what they wanted to do, except to oppose, to the best of their ability, the acquisition by the company of the right of way.

The Lake Front Tracks.

The Lake Front Tracks.

There is an almost unbroken procession of teams, engaged in hauling off debris to the lake front, continually passing along Wabash avenue and other prominent streets. It is quite possible that the lake front will be filled clear out to the Illinois Central breakwater from Park row north to where the Illinois Central Company has already filled out beyond that point. Before the leaves shall fall in the autumn the Illinois Central Railroad track will no longer pass over any portion of Lake leaves shall fall in the autumn the Illinois Central Railroad track will no longer pass over any portion of Lake
Michigan, but will be as much on terra firma as any other
road entering the city; and there is little doubt but that
in less than 12 months the whole front will be devoted to
dockage purposes, and the breakwater, which used to be
a terror to lake seamen in northeast storms, will be transformed into a dock front where vessels will lie in security, protected by the outer breakwater which the general government is constructing, and which is so far done
as to protect the Illinois Central breakwater, throughout
a great part of its extent.

Growth of a Chicago Banking Honse.

drowth of a Chicago Banking House.

Jacob R. Shipherd & Co., whose banking house was established in Chicago some years ago, soon found it necessary to open another in New York, and have lately

established one at Frankfort-on-the-Main, one of the greatest financial centers of Europe, in order to complete their facilities for their business, which consists largely in the placing of railroad and municipal bonds.

Chicago, Danville & Vincennes.

Chicago, Danville & Vincennes.

By the time table which went into effect on the 25th ult. the passenger trains of this road leave Chicago at 7:40 a. m. and 5:05 p. m., the former reaching Danville at 1:00 p. m., and the latter reaching Monence (54 miles) at 9:50 a. m. The Danville passenger connects with the roads below so as to enable its passengers to reach Terre Haute (183 miles) at 3:10 p. m., and Evansville (292 miles) at 9:05 p. m., and thus making the latter place as accessible to Chicago as are St. Louis, Cairo, Louisville and Cincinnati. Returning, the passenger train leaves Danville at 9:30 a. m. and reaches Chicago at 3:20 p. m. The Monence accommodation leaves that place at 5:40 a. m. and reaches Chicago at 9:25 a. m.

There are two regular freight trains between Chicago and Danville,

and Danville.

Chicago & Northwestern.

Unioago & Northwestern.

There have been this week some very large purchases of, or attempts to purchase, the stock of this company, and there is a rumor that the Vanderbilt party is making an effort to secure the line completely under its control, thus completing a line from New York to Great Salt Lake under the same general management, it being taken for granted that Horace F. Clark will be made President of the Union Pacific. It has been argued that under the classification act it will require three years to change the directory so as to give a new party control. This may classification act it will require three years to change the directory so as to give a new party control. This may be quite true; but it is understood that the Vanderbilt interest is already represented in the directory, and we do not know that the interests of any of the present directors would necessarily cause them to oppose a combination with such a party. The directors whose terms expire next June are G. S. Scott and H. Kennedy, New York; L. Ten Have, Frzn., Amsterdam, Holland; W. L. Scott and Milton Courtright, Erie, Pa.; and one other. Scott and Countright are members of the Lake Shore directory.

directory.

It is reported that the route of the Madison Extension beyond Wonewoc is finally decided, and that it will pass through the towns of Elroy in Juneau County and Glendale and Wilton in Monroe County to Sparta, on the line of the Milwaukee & St. Paul, whence the line will be but a short distance north of the latter road to a junction with the La Crosse, Trempealeau & Prescott road a few miles above La Crosse. The junction of the branch to Tomah to connect with the West Wisconsin will be at Glendale.

#### OLD AND NEW ROADS.

Chester & Tamaroa.

This company's line is now open for business throughout the length of 41 miles from Tamaroa (on the Illinois Central Railroad 280 miles from Chicago) southwest to the Mississippi River at Chester. •The stations and distances from Tamaroa are:

Tamaros	0 Cutter20
Dawes	5 Barnard
Holt's	6 Steele's Milis26
Pinckneyville	10 Bremen31
Cowen	.14 Poland
	.16 Clove's
Galvin	.18 Chester41

A train leaves Tamaroa daily at 11 a. m. and reaches Chester at 2 p. m. Returning, it leaves Chester at 3 p. m. and reaches Tamaroa at 3.

Connections are made with the Illinois Central at Tamagoa, with the Belleville & Southern Illinois at Pinckneyville, and with the Mississippi River steamers at Chester. The line runs through the Chester coal field, the seal of approach in quality the celes. at Chester. The line runs through the Chester coal field, the coal of which is said to approach in quality the celebrated "block coal" of Brazil, Ind., and to be of special

brated "block coal" of Brazil, Ind., and to be of special value for iron working.

The officers of this company are: D. C. Barber, Tamaroa, Ill., President and General Superintendent; Z. P. Curlee, Tamaroa, Vice-President; R. M. Davis, Pinckneyville, Ill., Treasurer; W. B. Stephenson, Cincinnati, Secretary; R. D. Carothers, Cutter, O., Assistant Superintendent; George W. Cavett, Tamaroa, General Freight and Ticket Agent.

Wisconsin Central.

Wisconsin Central.

The section of 40 miles on this line above Stevens' Point will be ready for the iron early in the spring, and the contract has recently been let for the construction of 120 beyond that 40. This will bring the road to the Penoka iron range, and within 30 miles of Ashland, which latter section is to be ready for trains by the middle of November. There are 15 locomotives on the 64 miles of road in operation from Menasha to Stevens' Point.

A New Louisville Bridge.

A New Louisville Bridge,
The Louisville Ledger says:
"The project for a bridge over the Ohio River between
Jeffersonville and Louisville, in the vicinity of the Galt
House on this side of the river, is, we are told, daily
gaining strength. One of the prominent citizens of Jeffersonville assured us yesterday that citizens of that town,
and wealthy gentlemen largely interested in real estate
there, would subscribe at least \$500,000 to the stock of
the proposed bridge, provided its terminus in this city is
above First street. An equal amount of stock, and probably double the amount proposed to be taken at Jeffersonville, will, we are assured, be subscribed at Louisville.
It is understood the Ohio & Mississippi Railroad will
also subscribe not less than \$800,000."
Mansfield, Coldwater & Lake Michigan.

Mansfield, Coldwater & Lake Michigan.

Mansfield, Ooldwater & Lake Michigan.

A telegram from Mansfield, O., reports that the entire portion of this line in Ohio, except about twenty miles, is graded, and two weeks of good weather will suffice to complete the work. The bridging is in an advanced state, and the work of laying the iron will be commenced as soon as the weather will admit. There are ties already on the road sufficient for sixty miles, and 100,000 more will be delivered March 1, and for the entire road by the end of April. On the Michigan end, eighty miles are

graded and tied, with only eight to grade, and early in the season the entire line will be in operation, giving un-broken rail communication with Muskegon. The con-necting line between Toledo and Tiffin will be finished and in operation in the early summer months.

New York Central & Hudson River.

The Commissioner of Internal Revenue has rendered the following decision concerning the liability of this company for the income tax on its famous 80 per cent. company for the crip dividend:

1. Commissioner Douglas decides that the issue of interesceptificates to the amount of \$23,036,000 on the 19th day of December, 1868, by the New York Central Railroad Company is substantially a scrip dividend and taxable under the internal revenu

cember, 1605, by the New Jork Central Railroad Company is substantially a scrip dividend and taxable under the internal revenue laws.

2. That the admission of the company made, and yet of record, when the said certificates were issued, that they were based on the earnings of the road and expenditures of the company, equal in amount to eighty per cent, of the stock of the company,—\$23,-036,000 being the amount of the scrip dividend—is binding, and not to be disregarded as against the rights of the Government, though subsequently contradicted by the testimony of the coursel of the company; that the Commissioner, in the matter of admissions and contradictory explanations, has the power of a court to judge of and accept or reject the explanatory evidence.

3. That only such earnings, incomes, gains or profits as are represented after September, 1862, the date of the first income tax law, are liable to taxation.

4. That the measure of valuation for the taxation of scrip dividends is generally the "market value," but that where, by the admission of the company, the scrip actually represents dollar for dollar of its face, then the valuation thus solemnly given by the company will prevail in adjusting taxation.

5. That so much of the dividend as belongs to the period from September, 1862, to September, 1868, is to be taxed. In this case the dividend covering in time fifteen years' earnings, etc., six-fifteenths amount to \$3,214,400, on which a tax of five per cent. should be collected.

By this decision the company will have to pay a tax of

By this decision the company will have to pay a tax of \$460,720, instead of \$1,151,800, as according to the first decision. It is reported that the company will not pay the tax, but will appeal to the courts.

tax, but will appeal to the courts.

Canada, Michigan & Chicago.

Articles of association of the Canada, Michigan & Chicago Railway Company were filed with the Secretary of State of Michigan recently. The company proposes to build a railroad from St. Clair to Lansing, to be operated in connection with the Peninsular Railroad. The directors are L. D. Dibble, N. G. Isbell, S. W. Hopkins, C. H. Collins, J. I. Briggs, Robert Sewell, I. Cox, R. I. Carpenter, J. B. Harris, E. G. Mason, George P. Orton, Morton Coates Fisher, George Richardson—the last two of England. E. A. Hopkins, of New York, is reported to have taken a majority of the stock.

The proposed route as far as Lansing is close along that of the Michigan Midland.

Fort Wayne, Jackson & Seginger.

Fort Wayne, Jackson & Saginaw.

Fort Wayne, Jackson & Saginaw.

At the annual meeting of this company, on the 13th ult., the following preamble and resolution were adopted:

Whereas, The experience of the past year has shown the inability of the Pennsylvania Central and Michigan Central railroads to carry freely and promptly all the freight we have to offer them, thereby materially affecting the income of the company and cripping its resources; therefore

Resolved, That the Board of Directors be, and they hereby are, authorized to see what additional facilities may be secured for the transportation of freight from the present termin of the Fort Wayne, Jackson & Saginaw Railroad, either by a more perfect union with existing lines or the construction of new lines.

Newark. Somerset. & Straitsville.

Newark, Somerset & Straitsville.

The entire issue of the bonds of this company has been negotiated through a foreign house, the bonds being guaranteed by the Baltimore & Ohio Company.

Union Pacific.

guaranteed by the Baltimore & Ohio Company.

Union Pacific.

The first train through on schedule time since the great snow blockade which has interrupted traffic for so long arrived at Cheyenne from Ogden on the 23d ult. The first passengers to reach Chicago from San Francisco for twenty-eight days arrived on the same day. Trains since have run with some regularity.

The transfer books of this company are now closed until atter the annual election, to be held in Boston on the 6th. There is no considerable opposition to the Vanderbilt interest registered, and there seems to be no doubt of the election of Horace F. Clark as President.

The company, it is reported, through its attorney, B. F. Wade, is soliciting Congress for additional legislation securing to the company certain lands held by squatters along the line of the road. It is charged that these settlers, having obtained knowledge as to the route to be taken by the railroad, immediately settled on land contiguous to the track, and many of them upon the alternate sections granted to the company under an act of Congress. The law not having been complied with in the pre-empting of these claims, the agents of the company age sired to sell the land to the occupants, but could not succeed in obtaining payment, and they desire to have the committee recommend legislation to compel the removal of the squatters and confirm the title of the company to the tracts in dispute.

It is reported that recent arrangements have been made for the interchange of traffic between the Denver Pacific

pany to the tracts in dispute.

It is reported that recent arrangements have been made for the interchange of traffic between the Denver Pacific and the Union Pacific. The close connection of the Denver road with the Kansas Pacific has hitherto made the Denver and Colorado business unprofitable to the Union Pacific, which, it was supposed, could only get privileges over the Denver road by giving the Kansas Pacific something like a fair chance to do a through California business.

The following statement of the earnings and expenses for the year 1871 are reported:

Gross traffic \$7,576,750 \$7,625,277 \$2,625,2 .... \$3,943,597 Net income.... \$2,947,869

the first 19 days of February, during which the road was closed most of the time as a through route, the earnings are reported at \$467,000. This is at the rate of \$712,800 for the month, which is nearly \$80,000 more than the average earnings per month in 1871, and inclines one to wonder whether a snow blockade is not a good thing for traffic. But we will not answer for the correctness of the figures reported the figures reported.

Louisville & Cincinnati.

A charter has been granted for and work has been commenced on a narrow-gauge railroad from Louisville up the Ohio to Westport, and efforts are making to secure a charter which will complete the line along the river to Covington and Cincinnati.

Rossville & Indiana.

Rossville & Indiana.

This company filed certificates of incorporation with the Secretary of State of Illinois on the 23d ult., the capital stock being placed at \$100,000. The railroad will commence at a point on the Chicago, Danville & Vincennes Railroad, in Vermillion County, Ill., distant about five miles south of Rossville, and extend thence in a southeasterly direction through Vermillion County to a point on the State line of Indiana, and will be about five miles in length. The Commissioners to open books for subscription to the capital stock are A. B. Mecker, E. H. Jacquelin, F. E. Jones, W. J. Logan and J. P. Roberts. It is simply the Illinois end of an Indiana railroad which it is intended to construct into the Brazil coal fields.

Wellington. Grev & Bruce.

Wellington, Grey & Bruce.

The contract for the construction of a section of the southern branch of this railroad from Listowel to Lucknow has been awarded to Mr. William Hendrie.

Taxable Valuation of Missouri Railroads.

The following railroad companies of Missouri give their estimates of their taxable property as follows:

their commutes of their engagore property as io.		
Hannibal & St. Joseph	\$5,627,061	42
Missouri Pacific	2,819 498	65
Atlantic & Pacific	2,819,498	
North Missouri	2,948,551	
St. Louis & Iron Mountain	2,071,435	00
Missouri, Kansas & Texas	642,390	05
St. Louis & Santa Fe	191,595	81
Kas. City, St. Joe & Council Bluffs	1,269,094	17
Missouri, Iowa and Nebraska (41 miles road-bed not in-		
cluded	27,650	
Missouri River, Fort Scott & Gulf	87,140	00
Miss. Valley & Western	29.500	00
Quincy, Missouri & Pacific	456,540	00

Lake Erie & Louisville. This company, it is reported, has closed a contract for the construction and equipment of its line from its pres-ent southern terminus at Findlay, Ohio, southwest through Lima and St. Mary's, Ohio, and Union, Ind., to Cambridge, Ind., 1,500 tons of iron to be delivered May 1, Cambridge, Ind., 1,500 tons of iron to be delivered May 1, or as soon as navigation opens; an equal amount June 1, and 2,000 tons July 1, which will complete the road to St. Mary's, Ohio, 52 miles, and the remainder for the whole line as fast as it can be used. There is now 37 miles of the road in operation, from Fremont to Findlay. The completed line would be almost an air line from Sandusky to Louisville.

The work of completing the road has been put in charge of an executive committee, consisting of the President, Hon. Charles Foster; General R. P. Buckland and Calvin S. Brice, of Lima, Ohio, who are now engaged in securing local subscriptions.

Atlantic, Mississippi & Ohio.

Atlantic, Mississippi & Ohio.

The cities of Lynchburg and Norfolk, Va., it is said, are thinking about selling their stock in the Atlantic, Mississippi & Ohio Railroad. Lynchburg has some \$500,000. The city council favor the sale, and negotiations have been opened. The Lynchburg News says that should any other corporation than that headed by Gen. Mahone become the purchaser of the stocks owned by both cities, it would give it a controlling interest in the line. This will give the Southern Railway Security Company an opportunity to secure what it much desires, a line from Richmond to East Tonnessee, by which it would be able to control a line from Baltimore to the Indian Territories, which otherwise it is likely to seek by the construction of a new line over a very difficult country from Danville to Bristol.

East Line & Red River.

East Line & Red River.

This Texas company, recently organized in Jefferson, is preparing to construct a railroad from Jefferson northwest to the Red River near Sherman, Texas, a distance of about 150 miles. A contract for the construction of 85 miles of the line, from Jefferson to Sulphur Springs, Hopkins County, has been let to Morgan Jones, a responsible contractor, to be completed within two years. For some distance this country is wooded, but for the most part prairie, and is one of the best settled sections of Eastern Texas, the chief product being cotton. A considerable traffic in lumber is expected from the timber country near Jefferson to the prairies further west. The President of this company is H. P. Mabry; Vice President, Perry M. Graham; Treasurer, A. W. Taylor; Secretary, V. H. Claibourne; Directors, James Arbuckle, W. M. Harrison, D. B. Culberson, A. G. Clopton, J. M. Urquhart, W. C. Crawford, W. P. Williams, M. W. Covey. The route is a favorable one, and the line is likely to have the traffic of a wide and fertile district without competition.

Houston & Great Northern.

Houston & Great Northern.

This railroad, which has reached the Trinity, will be extended eight miles north of that stream to a station called Trinity as soon as the bridge over the Trinity is completed, which will be within two or three weeks, the road-bed being ready and the iron on hand. The branch to Huntsville will be completed about the same time. The further extension will depend upon the decision of the Supreme Court of the State concerning the land grant, which, it is believed, cannot fail to confirm it to the company.

Elizabethtown & Paducah.

This is a decrease of \$48,527 in gross receipts (about for 1 per cent.), and an increase of \$995,735 in net earnings (334 per cent.)

The earnings of the road for January are reported at \$340,000, which, considering the blockade which lasted through a large part of that month, is doing well. For

two new points. If the action of the Council of the city of Louisville is satisfactory, the company expects to build during the summer and fall sixty miles of road between Litchfield and Louisville, connecting Louisville with Paducah by a direct line.

St. Paul & Chicago.

A bill has passed the Minnesota Legislature legalizing the sale of this road to the Milwaukee & St. Paul, which secures in it an exceedingly valuable line.

New Clinton Bridge.

The Senate has passed the bill authorizing the new bridge across the Mississippi at Clinton, Iowa, which it is proposed to construct for the use of the Chicago, Burlington & Quincy, the Chicago, Clinton & Dubuque, and the Iowa Southwestern railroads.

Towa Pacific.

Iowa Pacific.

This company has issued a prospectus in which it gives the length of its line, from its proposed junction with the Chicago, Dubuque & Minnesota Railroad in Fayette County to Fort Dodge, as 132 miles, and from Fort Dodge southwest to Onowa, 109 miles. The estimate of the cost of construction is \$19,000 per mile with equipment. equipment.

Omaha Bridge.

The last span of this great bridge over the Missouri was completed on the 20th ult., and the work of removing the false work and completing the approaches is in

Southern Pacific of California.

An engineering party had completed a survey early last month of a route for the extension of this road as far south as San Fernando Mission, within 28 miles of Los Angeles, to which place it will follow the general line of the Los Angeles River. The engineers will continue the survey of a line to the Colorado.

the survey of a line to the Colorado.

Hannibal & St. Joseph.

This company has notified the New York Stock Exchange that their stock has been registered at the Farmers' Loan and Trust Company, and that the company will conform to all the rules of the Exchange. According to the decision of the Stock Exchange the 50,000 certificates recently issued are not a good delivery until the thirty days' notice required by the Board has expired. This will occur on the 14th of March, at which time the new issue will be registered at the same place, with the other stock of the road.

Neshville & Shawnestown

Nashville & Shawneetown.

Nashville & Shawneetown.

It is reported that General Winslow, President of the St Louis & Southeastern Railway Company, is negotiating for the purchase of the Clarksville & Princeton Railroad grade and charter, in Kentucky, to make it part of a new line from Shawneetown to Nashville from 15 to 20 miles west of the Evansville & Nashville road.

Dayton & Union.

This railroad, which extends from a junction with the Dayton & Western Railroad at Dodson, 15 miles west of Dayton, O., northwest 32 miles to Union, Ind., has been leased to the Cleveland, Columbus, Cincinnati & Indianapolis Company. It is supposed that a connection will be made with the new Cincinnati & Springfield Short Line, so that trains from Cincinnati may run through to Indianapolis by this route.

Memphis & Charleston.

Memphis & Charleston.

A stockholders' meeting of the Memphis & Charleston Railroad Company, held in Memphis on the 22d ult., ratified the lease to the Southern Railway Security Company, agreed upon lately by the directors. A considerable opposition was made by some stockholders, who, however, seemed to control but few shares, as 122,555 shares were voted for the lease to 9,560 against.

Little Rock & Fort Smith.

The officers of this and the Memphis & Little Rock impanies have agreed upon terms of consolidation, hich is made, apparently, as a preliminary to a lease to e Southern Railway Security Company.

Maysville & Lexington,

C. B. Child & Co., the contractors for constructing and equipping the Northern Division of this road, have brought suit against the company for the payment of \$89,000 in excess of the amount for which they contracted to do the work, charging that their contract was based upon detailed measurements and estimates furnished by the company, which were grossly incorrect, and made so with the design of misleading contractors as to the amount of work to be done. The case is now pending. Harford County Railroad.

Harford County, Md., is trying to secure the construction of a line from Belair, in that county, southward to a connection with the Pailadelphia, Wilmington & Baltimore Railroad at Edgewood or Magnolia, a distance of 10 or 12 miles. tance of 10 or 12 miles.

Washington, Cincinnati & St. Louis Narrow Gauge.

A bill for the incorporation of a company with this name has been introduced into the Virginia Senate. The route proposed is from a point opposite Washington westward.

westward.

Waynesboro & Monterey.
A railroad is proposed from Waynesboro, Franklin
County, Pa., southeastward nine miles to a connection at
the extreme northern bend of the Western Maryland
Railroad at Monterey Station, to be operated as a branch

Smyrna & Delaware Bay.

Smyrna & Delaware Bay.

At the annual meeting of this company on the 1st of February the contract made by the retiring board with E. K. Landis, himself one of the directors, for the construction of the road for \$300,000 was rejected. It is reported that if the road is completed the Baltimore & Ohio Company will run a line of boats to connect with it. Providence & Worcester.

This company has arranged a new passenger tariff by which there will be an average reduction of fares of 15

per cent., and second class tickets are no longer sold, there being scarcely any demand for such tickets in New England. Freights on coal, pig iron and similar heavy raw materials of manufacture are reduced about 25 per cent., and a slight reduction has been made on general freights.

West River Railroad.

This Vermont company offers to construct a line from Brattleboro northward, if Brattleboro will subscribe \$100,000 and the towns north \$200,000.

Harrisville & Parker's Landing.

A new railroad is proposed in the oil regions, to run
from Harrisville down Bear Creek to Taylor's Landing,
and considerable subscriptions have been received for it. Rensselaer & Saratoga.

This company will soon lay a track across Green Island to connect its track from Albany with the depot in Troy. In order to make this connection it has leased the right of way across the Central Railroad bridge spanning the Mohawk.

Mohawk.

Wilmington & Reading,
The annual report of the directors of the Wilmington (Del.) & Reading Railroad Company for the year 1871 shows receipts from transportation of \$167,791.97, operating expenses, \$107,436.09. The President mentions the construction of the Christiana Branch and wharf, and says "the indications are that a large shipping trade will be built up at this point." The receipts of the year show an increase of 92 per cent., and a further increase of 60 per cent. in the present year is indicated. The shipment of peaches to interior Pennsylvania last summer "proved entirely satisfactory as an experiment," and 894 tons were transported. A number of new iron ore mines and stone quarries have been opened on the line of the road, from which a handsome increase of tonnage is expected. The branch road from Birdsboro' to Reading has been surveyed and prepared for letting. The President refers to the probable construction of the Berks County Railroad (connecting with the Lehigh Valley) and of the Conestoga Valley Railroad, from Springfield to Ephrata. The building of these important feeders will be of great value to the Wilmington & Reading line.

Frederick & Pennsylvania Line.

rederick & Pennsylvania Line.

This company's annual report, dated Feb. 12, gives the following account of the condition of the company and its road: The road beds throughout the three divisions is practically completed; some little culvert work remains to be done. Track-laying has been carried from the State line to Big Pipe Creek, 10 miles, and from the junction with the Western Maryland Railroad to Little Pipe Creek, one mile, besides five turnouts; there are three miles of iron and 27,000 cross-ties on hand; the work has proceeded slowly for want of labor. Contracts have been made with Wendell Bollman, of Baltimore, for the Tuscarora and Monocacy river bridges, and for the viaducts over Little and Big Pipe creeks; the first is erected and the others soon will be. The financial cxhibit shows subscriptions paid in, \$309,000; bonded debt, \$153,000; floating debt, \$41,815. The total disbursements on account of construction and other expenses have been \$479,993.09; and the company has available assets applicable to completion of the work, \$131,367.93; in addition to uncollected subscription, \$9,350. The President adds:

"It will be the policy and purpose of your Directors to connect your road on the north with the Rocky Ridge & Emmittsburg road, looking to the shortest connection northward and westward from Harrisburg, and to the south toward Washington and also toward that chain of roads through Virginia which now constitutes the rich prize for which are contending the two great railway powers of this country, the Pennsylvania Central and the Baltimore & Ohio, extending to the far South, and of which chain your line occupies the natural route and the shortest."

Canada Pacific.

Mr. Hugh Allan, of Montreal, in a speech at a recent

Mr. Hugh Allan, of Montreal, in a speech at a recent meeting in favor of the Northern Colonization Railway,

said:

"Since he had taken the pains to inform himself thoroughly on the whole question, he had come to the conclusion that without the Northern Colonization a road to the Pacific would be an injury to Montreal rather than otherwise. Montreal was interested in having a road by the shortest possible route to the Pacific. That road he had offered himself to build. He had offered to build a road from the Pacific to Lake Nipissing, and now there was wanted a railroad to go to the latter place to join it. He had not the slightest doubt that such a road would be built, and when it was, Montreal and indeed all Lower Canada would acquire an importance that they never had before. The produce of the East—of China and Japan—would have to pass through that way, and the freight of the Western States would also have to come down by Montreal. There was not only the traffic of her own country, but also of others of which such a road would be the highway. In view of these things he could not understand how any one could hesitate for a moment to carry through such a work. He had, on his part, determined to use all his energies to that end, and he was sure it would be accomplished." Since he had taken the pains to inform himself

North Grey.

This branch of the Northern of Canada, it is hoped, will be opened to Meaford, 22 miles, by July. It and the Toronto & Muskoka are to be operated by one management under the name of the "Northern Extension."

# PERSONAL.

—In 1847 Henry Ward Beecher, who was then preaching in Indianapolis, was nominated as President of the Madison & Indianapolis Railroad Company, and it took twenty ballots to decide that he should not be elected, Governor Brough, of Ohio, being finally chosen.

-Legrand Lockwood, the head of the banking house

of Lockwood & Co., of New York, died of pneumonia on the 24th inst. Mr. Lockwood was long one of the leading financial managers of the Michigan Southern & Northern Indiana Railroad Company, and at the time of his death a member of the Pacific Mail directory.

#### TRAFFIC AND EARNINGS.

—Within four days the Belleville & Southern Illinois Railroad brought into Belleville, Ill., a town of about 10,000 inhabitants, 587 car-loads of coal, for consumption

-For the second week of February the following earnings are reported:

Pacific & Missouri......\$53,762 Toledo, Wabash & Western...97,397 1871. \$51,616 78,161

#### ELECTIONS AND APPOINTMENTS.

—The annual meeting of the Indianapolis & St. Louis Railroad Company, for the election of a new Board of Directors, was held in Indianapolis, February 12, and resulted in the choice of the following persons: Thomas A. Scott, of Philadelphia; J. N. McCullough and Thos. D. Messler, of Pittsburgh; Oscar Townsend and H. B. Hurlbut, of Cleveland, and E. W. Woodward, of Indianapolis. The Board subsequently organized by electing E. W. Woodward President, and E. King Secretary and Treasurer. In this directory, McCullough, Hurlbut and Woodward succeed Thomas A. Morris and Edward King, of Indianapolis, and Pliny Hoagland, of Fort Wayne, elected one year ago; though most of these chances were made within the year. Scott, McCullough and Messler are officers of the Pennsylvania Company; Townsend is President and Hurlbut Vice President of the Cleveland, Columbus, Cincinnati & Indianapolis Company, which is counted a Vanderbilt corporation.

—At the annual meeting of the Fort Wayne, Jackson

Company, which is counted a Vanderbilt corporation.

—At the annual meeting of the Fort Wavne, Jackson & Saginaw Railroad Company, held in Jackson, Mich., cn the 13th ult., the following were chosen directors for the following year: Jackson, Mich.—P. B. Loomis, E. A. Webster, D. Merriman, W. D. Thompson, W. R. Reynolds; Jonesville, Mich.—E. O. Grosvenor; Fort Wayne, Ind.—A. P. Edgerton, Henry J. Rudisell, Jno. Bass, Henry Baker; Detroit—Jas. F. Joy; Angola, Ind.—Chas. B. Kinney; Waterloo, Ind.—C. A. O. McClellan. The following officers were chosen: President, P. B. Loomis, Jackson; Vice-President, A. P. Edgerton, Fort Wayne; Secretary, Eugene Pringle, Jackson; Assistant Secretary and Treasurer, B. S. Chapin, Jackson; Executive Committee, B. P. Loomis, Jackson; E. D. Grosvenor, Jonesville; H. A. Rudisell, Fort Wayne; W. D. Thompson, Jackson; E. A. Webster, Jackson.

# THE SCRAP HEAP.

Phonixville Bridge Works.

Mr. Clarke, of Clarke, Reeves & Co., the proprietors of these works, gives us some interesting information concerning the work done by this company from its organization under its present title up to the close of

concerning the work done by this company from its organization under its present title up to the close of 1871, a period of fourteen months.

The company in that time entered orders upon its books for 88 spans, equivalent to 11,619 lineal feet of single-track bridge, of an aggregate value of \$900,000. Some of these bridges are completed, some in process of erection, and some in the shops. In the same time the company has completed the new bridge at Albany, which was commenced before the organization of the company under its present title. This has 13 spans, equivalent to 6,000 lineal feet of single-track bridge, and of the value of \$300,000. The company calls attention to the fact that these are all first-class railroad bridges of iron, as it builds no wooden or combination bridges, and very few highway bridges. It compares the amount of its work with similar work done by the American Bridge Company, of which we made a notice lately—that is with its purely iron work. The latter company erected 8,620 lineal feet of fixed spans and 1,460 of draw spans, making a total of 10,080 lineal feet, so that in this work the Pnenixville is 1,539 feet ahead. Who will "see this and go better?" go better?

The Miller Platform in Russia.

We have had an opportunity of seeing a copy of letters patent granted by the Government of Russia to Colonel Ezra Miller for his admirable platform, coupler and buffer, which has saved so many lives and so many cars in this country. The rolling stock in Russia is similar to that of this country, so there is no difficulty in adapting the invention. Perhaps our readers would be pleased to know how Russian letters patent are drawn; but they must excuse us, for the document before us covers four enormous closely written folio pages. Another slight obstacle lies in the fact that it is written in Russian, whose very letters, printed and script, are puzzles, having the general effect that might be expected of a company of Koman, Greek and Anglo-Saxon letters on a spree. On a pamphlet in Russian, giving a description of the invention, we find where the inventor's name should be two curious words, which we are assured is his name in its Slavic dress. It begins all right with an E. Then follow the figure 3, a nondescript triangle on two legs, a P, another P, wrong end up this time, and an I. This finishes the Christian name, and a very unchristian look it has. Then the surname begins naturally again with an M, a reversed N follows, two A's, without the cross-line, an E, a P, and an A. Having spelled it out so carefully, our readers may pronounce it for themselves—at least we won't do it for them.

But with all their odd letters and fearful words, the Russians have made a very pretty piece of work, both in the manuscript and the printed text, the latter being of rare elegance; and if they shall adopt the invention generally they will have manifested a respect for the lives intrusted to their care which, we must confess, some of our American managers have failed to show. The Miller Platform in Russia.